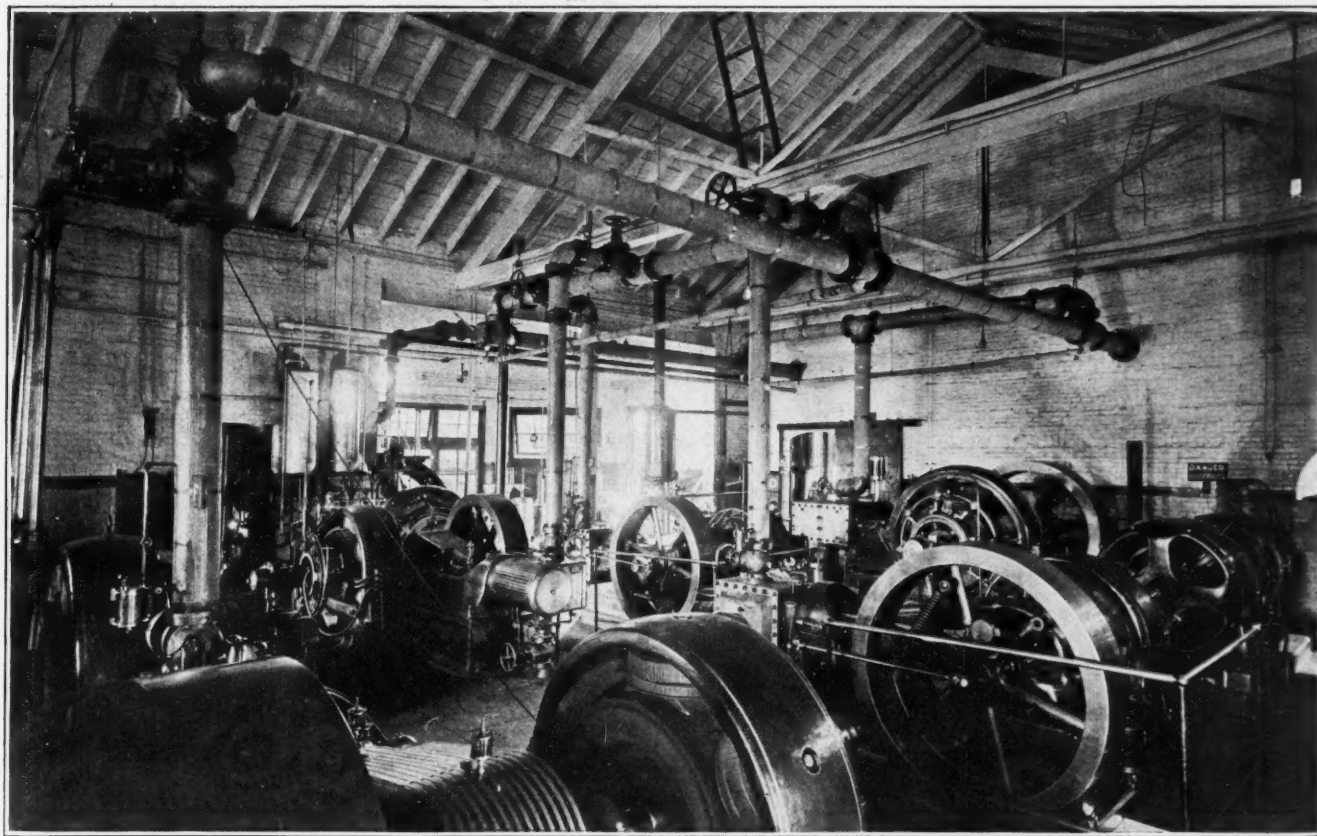


Municipal Journal

Volume XXXIII

NEW YORK, NOVEMBER 7, 1912

No. 19



SOUTH NORWALK ELECTRIC WORKS, SHOWING STEAM UNITS.

SOUTH NORWALK ELECTRIC WORKS

History, Equipment and Operating and Business Methods of One of the Oldest and Probably the Most Successful Municipal Electric Plant in this Country.—Latest Financial Report.

From a small beginning twenty years ago, with one 100-horsepower boiler and engine and two 60-arc light dynamos, the South Norwalk electric plant has grown to a capacity of 885 kilowatts, supplying a city of ten thousand inhabitants with the largest per capita consumption of electric current on record, at rates which are the lowest prevailing in the state. The management of the enterprise has been throughout in the hands of commissioners appointed by council or terms of three years. The commissioners, like all city officers in South Norwalk, receive no salaries for their services, an interesting comment, by the way, on the theory that city affairs are best managed by a single small board of highly paid commissioners.

Financially the plant is in excellent condition. Representing an investment of \$200,000, a sum not much greater than would now replace it, the net debt is only

\$20,000, and in another year this will probably be paid off. Then the works will be in a position to pay into the city treasury, for the reduction of taxation, \$10,000 a year, equal to a 5 per cent. dividend on the total investment. In addition to this an estimated sum of ten or fifteen thousand dollars will be available yearly for extensions and improvements.

To establish the merits of municipal ownership is not the object of the Municipal Journal or of this article. But no account of this plant is complete without the statement that it has been often referred to as a notable example of the success of municipal ownership. Because of this reputation it has been examined by accountants and electrical engineers many times during the past twenty years and has been favorably commented on in all instances.

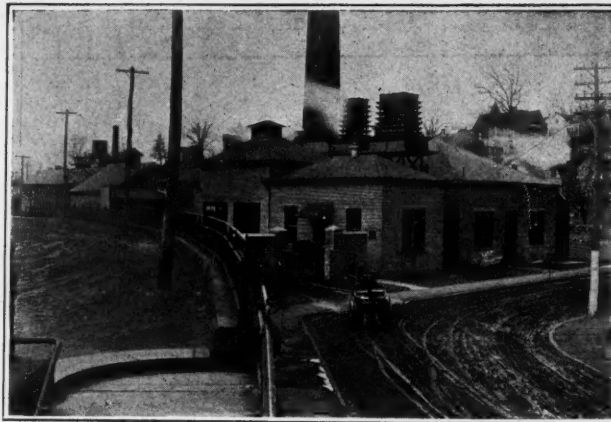
To what extent the success has been due to natural

conditions, choice of equipment and good management can best be judged by an examination into details. While the population of the city is about 10,000, it is the manufacturing center for perhaps 20,000 people. The area is small—about a mile and a quarter. Hence there are no long transmission lines. The current sent out is direct, an unusual feature for an American plant, though the type is standard in Europe. Alternating current is favored in most American cities because the transmission lines are usually long, and there is less loss in such than where direct current is used. The puzzling problem of all electrical plants is to equalize the load as much as possible throughout the whole day. Everybody knows that there is an excessive demand for current late in the afternoon, just before the demand for manufacturing purposes has stopped and general evening illumination has begun. Just what this means to the power plant few people realize. The South Norwalk Electrical Works is fortunate in having an unusually equal load, yet the peak load is twice the ordinary load. The use of current for commercial purposes is unusually large. This is due both to the manufacturing character of the city and to the fact that the management has fostered this business. Another mechanical peculiarity of the plant is that most of the power is generated by Diesel internal combustion engines.

Before describing the mechanical equipment and operation of the plant in greater detail, a brief account of its history, giving the dates of important additions, is in order. The original plant was built in 1892 on the present location, near the railroad station, about a quarter of a mile from the business center of the city. The installation consisted of a horizontal tubular boiler (still in service), a 100-horsepower engine, two dynamos and a pole line connecting 86 series open arc lamps. In 1898, additions were made to the plant at a cost of \$20,000, and commercial service began with six consumers having altogether about one hundred 16 candle power lamps. In 1910 the full capacity of the commercial service had been taken up and a further enlargement costing \$17,500 was made. Incidentally a capital charge of \$5,639 had to be made for counsel expenses for litigation growing out of the commercial service, the suits being dropped. In 1901 the plant first supplied commercial power. In 1903 a meter system was installed at a cost of \$5,000 and a further enlargement costing \$15,000 made. Power and lighting circuits were combined and a 24-hour service given.

In 1905 a further enlargement was necessary. Partly because space for additional boilers was lacking, after an investigation an internal combustion engine was bought from the American Diesel Engine Company. These changes cost \$22,000. In 1907 the fifth enlargement became necessary and a second Diesel engine was purchased. The electrical equipment, as in 1905, was furnished by the Fort Wayne Electrical Company. These extensions cost \$27,000. In the same year the fire alarm system, which from the beginning had been operated from the electric plant, was enlarged by the addition of Gamewell six circuit, switchboard, master box and storage battery. In 1910 the works supplied a standard time service. In the same year the street lighting was put on an all night basis. In 1910 extensions were made to the works costing \$30,000, the largest item being a third Diesel engine and generator. In regard to this last improvement it is notable that the moving of the whole plant to a large lot on the water front was seriously considered. If the demand for current continues to increase this will ultimately have to be done.

The power house as it stands to-day is a substantial brick structure one and a half stories high, of rather pleasing appearance, for a power house at least. Ivy growing up

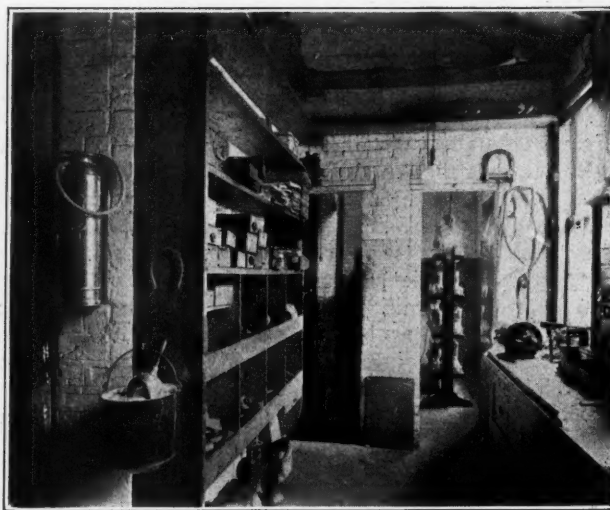


SOUTH NORWALK ELECTRIC WORKS.

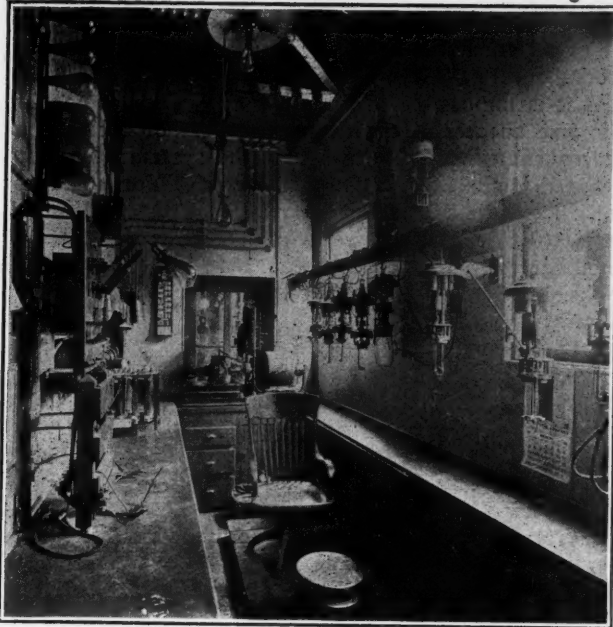
on the walls and trees in the background add to its attractiveness. The main building measures 48 by 109 feet. A door on the side leads into the cashier's office and through this the superintendent's office is entered. The engine and generator room is immediately back of the office, part of it also facing the street. It contains eight generating units as follows: Three 225 horsepower Diesel fuel oil engines, each connected to a 160 k. w. Fort Wayne generator; four 110 h. p. Watertown high speed engines direct connected to generators (there is not a belt in the place). The generators connected to the steam engines are some of them quite old. They are of the Siemens and Halske and Eddy types, generating direct current at 250 volts. There is also a No. 12 Brush multi-circuit arc generator of 130 light capacity connected to a G. E. 90 h. p. motor. The switchboard is marbleized slate.

The boiler room, back of the engine room, contains four 125 horsepower return tubular boilers, all equipped with water arches. The massive brick chimney rests on solid rock. In its base is a fireproof vault for city records. There is a storage shed and yard, not any too large. Smaller items are: Stock rooms, repair room, laboratory, fire alarm battery room, fire alarm apparatus, telephone booth, two feed water heaters, two pumps, a whistle for fire service and to call employees. In the yard is a storage tank for fuel oil of 3,350 gallons capacity.

The following electrical conductors radiate from the station: 4 high tension arc mains, 8 low tension feeders to the cribbed lighting and power distributing mains, 6 pressure wires, 2 station service wires, one to control



STOCK ROOM; BATTERY ROOM IN REAR.



TESTING ROOM.

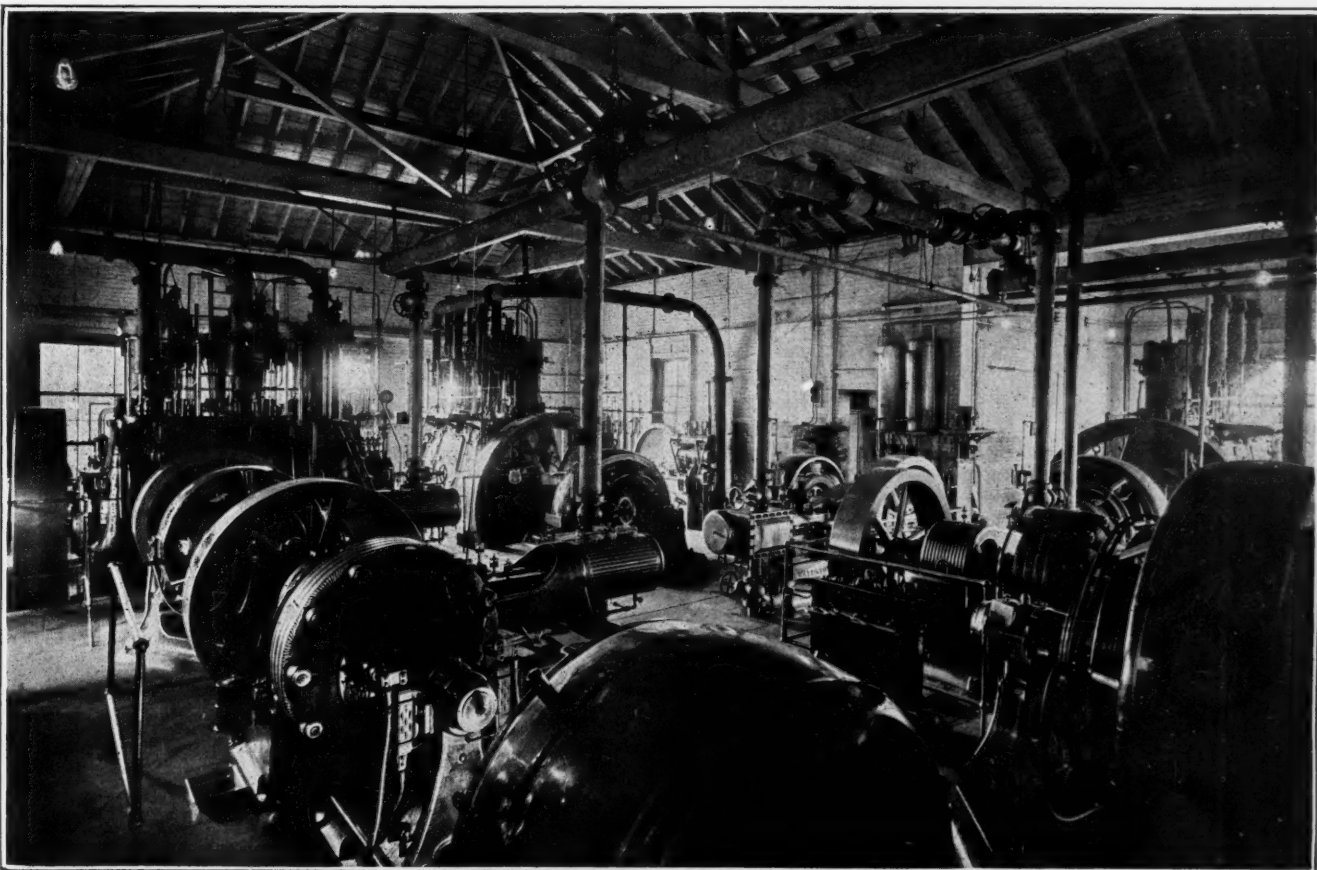
the city clock and special bridge lights, and 8 for the fire alarm.

The distribution of current consists of two principal systems,—street lighting, and commercial lighting and power. Besides these there are the departments of public buildings, bridge lighting, fire and police alarm service. The street lighting is now on an all night schedule of about 4,000 hours per light per year. These lights are charged to the city at \$54, a reduction of ten per cent. made this year on last year's prices. There are 118 arc lamps on mast arms. Most of these are direct current series enclosed, consuming 350 watts. A num-

ber of magnetite lamps have been installed recently, being placed for the most part at intersection of streets. The cables are strung on poles. Some of these cables are now 20 years old and are in substantially perfect condition. The manufacturers who supplied them were the American Electrical Works, and the Ansonia Electrical Company. There are no underground cables. There is a short marine cable at a drawbridge which is the cause of occasional trouble, being broken now and then by passing boats. On suburban streets there are 48 tungsten incandescent lamps on brackets. For streets with trees they are much preferred to arc lamps, and many people prefer them for any street, at least in comparison with the enclosed arc lamps. The tungsten lamps use from 50 to 75 watts and are charged to the city at \$10.80 a year, a reduction from the former charge of \$13.20. The tungsten or mazda lamps are all furnished by the Bryan Marsh Electric Company. There are about 16 miles of wire in the street lighting circuits.

The commercial service consists in supplying incandescent lighting in residences, as well as power and heat for minor domestic appliances; arc and incandescent lighting for stores and power for manufacturing purposes. The number of small manufacturing industries in the city is large and many sewing machines and other light apparatus are run by electricity from the city works. There are about 36 miles of mains or feeders supplying the commercial service. The normal capacity measured in 60 watt lamps is 14,700. The approximate number of lamps connected, measured in 60 watt equivalents, is about 20,000 and the total rated horsepower in motors connected is 1,166. The schedule is a continuous 24 hour service.

For interior lighting the department supplies 16-candlepower carbon lamps without charge. The lamps cost about 15 cents, give good service for 600 hours and may last for 900, giving an inferior light. Mazda tungsten



SOUTH NORWALK ELECTRIC WORKS. DIESEL ENGINES IN REAR, STEAM UNITS IN FOREGROUND.

ceipt from the city or from some one else by the city.

Notice to delinquent consumer.

Report of delinquent consumers, stating the amount, reason for non-payment and probabilities of collecting.

Weekly time card and voucher, to be signed by each employee, giving distribution of time for each day.

No. _____ CITY OF SOUTH NORWALK ELECTRIC WORKS

TIME CARD AND VOUCHER OF _____ for services as _____

_____ for work ending _____ and _____ Amounting to \$ _____

DAYS	CONSTRUCTION HOURS	REPAIR AND MAINTENANCE HOURS	OPERATING HOURS	FIRE ALARM HOURS	POLICE TELEGRAPH HOURS	SPECIAL HOURS	TOTAL HOURS	REMARKS
SUNDAY								

WEEKLY TIME CARD.

The information on these reports is finally consolidated in the Distribution of Expenditures Book, which has the following headings:

NEW CONSTRUCTION:

Generation—

Buildings, Real Estate,
Steam Engs., Boilers, Pumps, Aux.,
Fuel Oil Engs., Compressors, Tanks, etc.,
Dynamos, Switchboard, Aux.,
Supplies, Miscellaneous Exp.

Distribution—

Lines, Poles, Cables, Aux.,
Meters,
Supplies, Misc. Exp.

MAINTENANCE:

Generation—

Buildings, Real Estate,
Steam Engs., Boilers, Pumps, Aux.,
Fuel Oil Engs., Compressors, Tanks, Aux.,
Dynamos, Switchboard, Aux.,
Supplies, Misc. Exp.

Distribution—

Lines, Poles, Cables, Aux.,
Meters,
Supplies, Misc. Exp.

OPERATING EXPENSES:

Generation—

Pay Roll,
Fuel (Coal),
Fuel (Water),
Oil, Waste, Packing, etc.,
Supplies, Misc. Exp.

Distribution—

Pay Roll,
Incandescent Lamps,
Arc Globes, Carbons, etc.,
Supplies, Misc. Exp.

Meter Reading, Testing, etc.—

Pay Roll,
Supplies, Misc. Exp.

Administration—

Pay Roll,
Supplies, Misc. Exp.
Insurance—Fire, Boiler, Liability, etc.
Interest—Bonds, Notes.

REDUCTION OF DEBT:

SPECIAL:

FIRE ALARM SYSTEM:

Pay Roll,
New Construction,
Maintenance,
Operation.

POLICE TELEGRAPH:

Pay Roll,
Supplies, etc.

EXTRAORDINARY:

Note:—Standard time clock expense to be charged to Fire Alarm.

The reports relating to operating and other physical matters are the following:

Daily Load Report. This gives the principal weather conditions every 6 hours. The engine-generator units in service every hour, the amperes delivered by each

machine and the totals every hour. Voltage at busbar and main. Steam pressure. Gallons of fuel oil burned. Record of starting and stopping street service. Boilers in service. The records of the recording watt meters at the station. Deductions as to output in kw. h. per coal and oil units. Supplies used, including fuel oil and waste.

Daily Light and Power Report. Gives troubles on telegraph, street and commercial lighting systems. Time of starting different circuits. Details regarding load on circuits. Lamps trimmed, supplies used, changes of lamps, additions and subtractions of light and meters in commercial service.

Weekly Report of Line Foreman.

Weekly Incandescent Lamp Report. Gives addition to service and renewals each day.

Requisition for Supplies and Repairs. A pad of these hangs handy for all employees to write down all supplies needed as soon as they are thought of.

Index card of installation for light or power. These cards are never thrown away, even if the service is discontinued.

Index card of street lamp locations. Gives date of installation, style of lamp, date of removal or renewal, and reason for the same.

The following five forms all relate to meters:

Report of Installation. Gives items of lamps or motors served.

Meter card. Two forms, black and red, otherwise alike, former for light, latter for power. Gives dials so that actual reading of meter is shown.

Data Relating to Meter. Filled out when meter is first received from factory. Gives complete description of style.

Location Record. Filled out when meter is installed. Gives date, location and nature of service, reading when installed or removed and reason for removal.

CITY OF SOUTH NORWALK ELECTRIC WKS. METER CARD.

					DATE _____
					BY _____
					READING _____
					DATE _____
					BY _____
					READING _____
					DATE _____
					BY _____
					READING _____
					DATE _____
					BY _____
					READING _____
					DATE _____
					BY _____
					READING _____

LOCATION OF METER _____

METER NO. _____ AMP. _____ CONST. _____ ROUTE _____

NAME _____

INSTALLATION NO. _____ ADDRESS _____

METER CARD—SAME ON BOTH SIDES.

Meter Test. Gives record of conditions as found and as left. Details of test, per cent. error, signature of inspector.

Record of Operation Book. This is practically a manufacturing account, with daily entries in which materials, supplies and labor are checked with the output. The headings of this book are as follows:

Record of Operation for Month Beginning 12 Noon,
....., 191.....

STREET SERVICE:

Arc Lamps—

Circuit No. 1.....

Circuit No. 2.....

Total.....

Incandescent Lamps—

Circuit No. 1.....

Circuit No. 2.....

Total.....

Circuit No. 1 Run—

Started P. M., hours..... minutes.....

Suspended, hours..... minutes.....

Stopped, hours..... minutes.....

Circuit No. 2 Run—

Started P. M., hours..... minutes.....

Suspended, hours..... minutes.....

Stopped, hours..... minutes.....

COMMERCIAL SERVICE:

Connected Load—

60 watt equivalents in incandescent lamps.....

No. of arc lamps.....

Total 60 watt equivalents.....

Connected K. W. load in lamps.....

Rated H. P. in motors.....

Total connected load in K. W.....

Consumers—Light..... Power..... Total.....

SUPPLIES CONSUMED:

Carbons—Street..... Commercial..... Total.....

Street Incandescent Lamps.....

Commercial Incandescent Lamps—

Carbon lamps, 35 watt.... 60 watt.... 120 watt....

Metallic lamps, 25 watt.... 40 watt.... 60 watt....

100 watt.... 150 watt.... 250 watt.... 500

watt....

Lubricating Oils—Cyl. oil, pints....; Crank case oil,

pints....; Machine oil, pints....

Fuel—Coal, pounds.....; Fuel oil, gals.....

K. W. H. OUTPUT:

Street Service.....

Commercial Service.....

Total.....

Total K. W. H. by Fuel oil.....

Total K. W. H. by Coal.....

K. W. H. AND FUEL COMPARISONS:

Fuel Oil—K. W. H. per gallon.....

Gals. per K. W. H.....

Coal—K. W. H. per pound.....

Pounds per K. W. H.....

HISTORY OF MONTH:

Casualties, Accidents, Changes and Events of Importance, Facts and Details relating to Operation and Service.

All of the above headings have extra spaces for new sub-heads and special notations when needed. Each heading is at the top of its own column. Thus each day's doings is separately recorded on a single horizontal line on the page for the month—there being 31 horizontal lines to each page. At the bottom of each column comes the total and average for the full month. The history of the month is also in a division of its own at the bottom and extending across the page. At the end of each 12 pages, which constitute the record for one year, there is a full yearly page with the same headings as for the monthly pages, but with one line for each month, with totals and averages at the bottom for the whole year.

All of these records finally lead up to the monthly balance sheet, which records not only the money transactions of the month, but also physical data and finally makes cost comparisons with the same month of the previous year, noting increases and decreases in detail.

The following data from the annual report for the

year ended in October, 1912, made out substantially in accordance with forms, approved by the Public Service Commission of New York State, summarize the story of last year's operations:

Assets.

CASH:

On deposit with City Treasurer.... \$2,151.49

On deposit in banks 909.01

On hand 186.29

\$3,246.79

ACCOUNTS RECEIVABLE:

Consumers' lighting and power bills unpaid. 702.10

INVENTORY OF SUPPLIES, ETC.:

Estimated value and cost of general supplies and materials, largely consumable and liable to constant change in quantity, such as fuel, oil, carbons, lamps, globes, repair parts, tools, etc. 967.11

Land and Buildings \$17,080.75

Motive Power system 82,909.65

Electric Generating system 28,400.67

Distributing system 59,630.49

Miscellaneous equipment 1,754.33

\$189,775.99

Legal Expense, in contest of rights. 5,639.60

195,415.59

Total Assets \$200,331.59

Liabilities.

1892 Bonds, Street Lighting system. \$22,500.00

1898 Bonds, Commercial Addition.. 20,000.00

Total Bonded Debt \$42,500.00

Total Liabilities \$42,500.00

Less Sinking Fund 20,000.00

Net Liabilities \$22,500.00

Surplus 177,831.59

\$200,331.59

Report of Income and Expenditures.

INCOME:

Street Lighting \$6,795.90

Street Lighting, under bridges.... 100.80

Municipal Department Lighting.... 574.59

Commercial Lighting 41,550.08

Commercial Power 15,265.92

Supplies Sold 1,977.48

Ins. on Meters destroyed by fire... 76.95

Interest accrued from Sinking Fund. 36.66

Gross Income \$66,378.38

Less Consumers' Accounts uncollectable 45.69

Net Income \$66,332.69

EXPENDITURES:

Maintenance, Repairs, and Renewals—

Real Estate and Buildings..... \$642.45

Steam Engines, Boilers, etc..... 829.84

Oil Engines, Compressors, etc.... 5,007.38

Dynamos, Switch-board, etc.... 216.87

Pole Lines, Cables, etc..... 621.89

Miscellaneous Expense 101.03

Meter Repairs 286.75

\$7,706.21

Operation:

Generating—

Pay Roll \$7,347.32

Coal 3,855.96

Fuel Oil 5,092.95

Water 717.07

Oil, Waste, Packing, etc..... 1,163.86

Supplies 387.67

18,764.83

Distribution—

Pay Roll \$2,613.20

Incandescent Lamps 4,202.27

Arc Globes, Carbons, etc..... 93.55

Supplies 655.07

7,564.09

Meter Reading, Testing, etc.—

Pay Roll \$1,319.35

Supplies 35.47

1,354.82

Administration—	
Pay Roll	\$2,630.00
Surety Bonds	57.00
Supplies	967.75
	<u>\$ 3,653.75</u>
Interest Account	1,700.00
Insurance Account—	
Boiler Ins.	\$165.00
Fire Ins.	542.68
Employer's Liability Ins.	285.98
	<u>993.66</u>
Total Cost, Maintenance and Operation.	\$41,737.36
Summary.	
Total Sales, Net Income.....	\$66,332.67
Total Cost, Maintenance & Operation.	41,737.36
Gross Profit	\$24,595.33
Operating Resources.	
Net Income	\$ 66,332.69
Cash on Deposit and on Hand Oct.	
13, 1911	2,046.11
Acc'ts forw'd from Oct. 13,	
1911	\$624.71
Less rebates .....	.75
	<u>623.96</u>
Total Resources	\$69,002.76
Disbursements.	
Maintenance and Operation	\$ 41,737.36
New Construction	3,316.51
Deposit to Sinking Fund.....	20,000.00
Cash on Deposit and on hand Oct.	
13, 1912	3,246.79
Amount Due, but not Collected.....	702.10
	<u>\$69,002.76</u>

Commercial Lighting and Power.

Schedule:—Continuous service 24 hours per day.	
Class:—Parallel 2 wire 220 volts DC service.	
Normal capacity in 60 watt lamps.....	14700
Approximate miles of mains and feeders.....	36
Approximate lamps connected, 60 watt equivalents	20000
Total rated horse-power in motors connected....	1166

General Data, Capacity, Output, Etc.

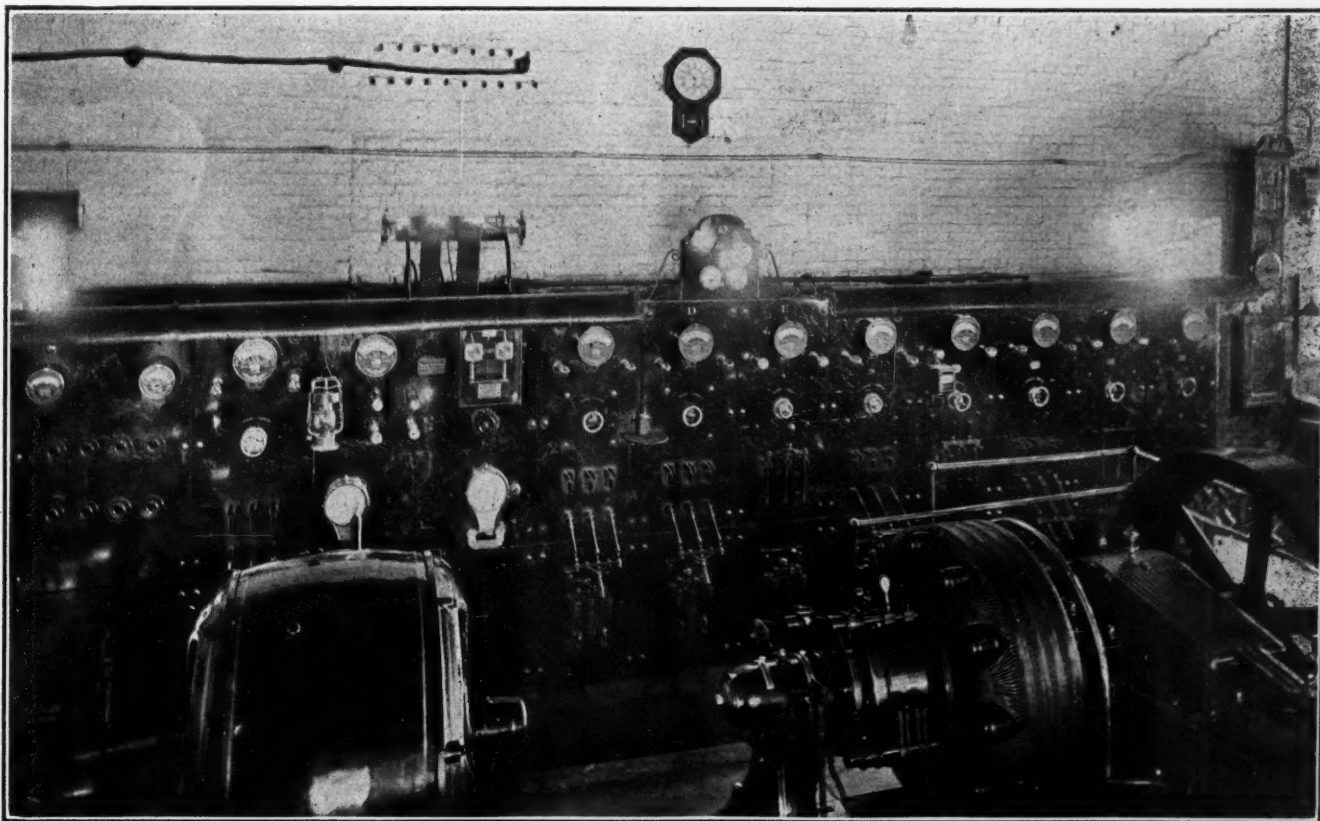
Rated boiler horse-power.....	500
Rated steam horse-power.....	655

Rated fuel oil engine horse-power.....	675
Kilowatt-hours output, Oct. 1, 1911 to Oct. 1, 1912	1,469,780
Kilowatt-hours output by coal, filling in loads...	102,755
Kilowatt-hours output by fuel oil.....	1,367,025
Kilowatt capacity of generators	885
Maximum kilowatt load during year, Nov. 20, 1911	725
Income per rated kilowatt capacity for year....	\$74.95
Income per kilowatt-hour.....	\$0.0451
Cost per kilowatt-hour, including int., rep. and oper. (all costs and losses also included, being gross mfg. cost).....	\$0.0283
Gain per kilowatt-hour.....	\$0.0168
Gallons of oil consumed per year for fuel.....	143,025
Pounds of coal consumed per year, filling in loads	2,498,945
Cost of coal per kilowatt-hour (a).....	\$0.0375
Cost of fuel oil per kilowatt-hour (ten months of year fuel oil cost 3c. per gal.; two months of year cost 4½ cts.).....	\$0.0037
Pounds of coal per kilowatt-hour (a).....	.243
Gallons of fuel oil per kilowatt-hour.....	.1046
Watt-hours per pound of coal (a).....	41.112
Watt-hours per gallon of fuel oil.....	9.557
Total consumers (lighting 959, power 92), (b) ..	1051

(a) Includes all coal for banked fires, heating, sudden calls, peak-loads, over-loads and all other steaming purposes, heavy loss.

(b) This is exclusive of all irregular intermittent consumers.

The organization consists of an executive staff consisting of three commissioners, Frederic Hunkemeier, president, John R. Spencer, secretary, and Thomas Robins, treasurer. Two of the commissioners are serving the second of their three year terms. The commissioners are appointed by the mayor and council who, of course, are responsible for the proper conduct of all city affairs. The operating staff consists of Albert E. Winchester, general superintendent, who has been identified with the works from the beginning. The clerical work is in charge of William H. Derringer, clerk and cashier, who with an assistant does all the accounting, a fact going to show that although the forms seem many and complicated, the expense is not prohibitive.



SOUTH NORWALK SWITCHBOARD AND TIME CLOCK.

SYRACUSE ORNAMENTAL LIGHTING

Five-Light Standards Carrying Tungsten Lamps—Wires Underground in Cable—Merchants Bear All Expense.

By H. J. BLAKESLEE, Supt. Bureau of Gas and Electricity.

The ornamental street lighting system of Syracuse has now been in use for about two years and consists at the present time of two hundred and twenty-eight ornamental posts of the type known as the five light Luxolabra manufactured by the Union Metal Manufacturing Company of Canton, Ohio. Each of these posts is 13 ft. high and consists of a pedestal and capital of cast iron and a sectional shaft between of pressed steel, fluted. The post is held together by means of rods which extend from the pedestal to the capital. In the pedestal is a door which allows access to the interior for connecting and disconnecting wires, etc. Each lamp-post carries five 50-watt Tungsten lamps, four of which are pendant and one vertical from the top of the pole. Alba globes are used, 16 ins. in diameter on top and 12 ins. lower. At the base of each pedestal is a short circulating attachment plug so arranged that each post may be cut out independently of any other. Inside of the post the wiring consists of 5,000-volt braided covered cable and each lamp socket is also of the short circuiting type so that individual lamps may be changed without interrupting the circuit.

The posts are spaced as nearly 50 ft. apart lengthwise of the street as other structures will allow. They are placed opposite each other on the street, that is, they are not staggered as is customary in many places.

All feed wires are underground, 5,000 volts No. 8 lead-covered cable being used in 2-in. iron pipe. The iron pipe is run in a narrow trench near the curb line. The lamps are operated on a series circuit of 4 amperes, the

supply being General Electric rectifiers from a 25-cycle source.

The cost of each pole, including underground wiring and lamps complete, is estimated at \$131. The average life of the lamps in service has been found to be approximately 3,000 hours.

The system was first installed in Salina street and owing to its popularity it was soon extended through four of the other principal streets in the heart of the city. The merchants of the city took the initiative in this matter and have up to the present time borne the entire expense of lighting the system. It is quite likely, however, that some time in the future, before very long, the system will be taken over by the city.

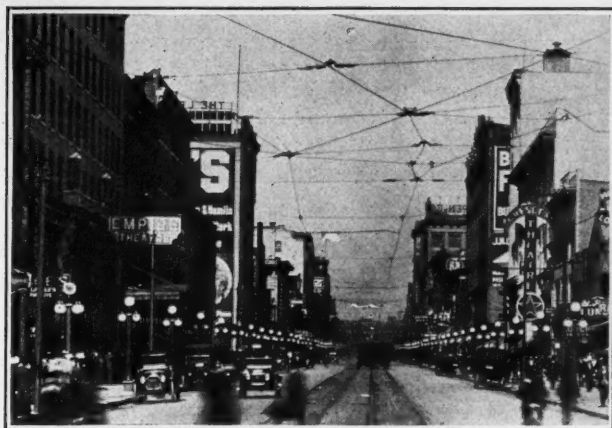
The lights at pres-



ORNAMENTAL STANDARD,
SYRACUSE.



SALINA ST., SYRACUSE, SOUTH FROM ERIE CANAL.



S. SALINA ST., SYRACUSE, NORTH FROM ONONDAGA ST., OCTOBER, 1912.



SAME VIEW AT NIGHT.

ent are burned until twelve o'clock midnight. The cost of lighting to merchants is reckoned on a frontage basis, the charges being 15 cts. per front foot per month, or about \$90 per post per year.

From observation it seems unquestionable that the installation of this system has had a very beneficial effect upon the business of the streets lighted and it is undoubtedly true that the extension of the system has increased the business and the valuation of property in the sections lighted. As an advertisement to the city of Syracuse, they have been very valuable. Syracuse is unique in one particular and that is the New York Central Railroad tracks run directly through some of the business streets of the city and the ornamental lighting system presents a very attractive feature to all persons passing through the city. It is probable that no other

city in the country has a reputation for beautiful street lighting so widely distributed over the country as Syracuse, owing particularly to the above fact.

The local lighting company which furnishes the current for lighting the ornamental poles has been very attentive to the maintenance of the system. The globes are washed frequently to insure their cleanliness and the poles are painted as often as their appearance indicates the necessity. In this way the system is always kept in a neat condition and presents a very pleasing appearance to the eye by day as well as by night.

From a lighting standpoint, independently of the ornamental features, the system is a great success. It is often said that there is no portion of Salina street upon which a pin could not be seen lying in the street by a person on the sidewalk at night.

ORNAMENTAL STREET LIGHTING

Arc, Festoon and Ornamental Post Systems.—List of Cities Using Each.—Payment for Ornamental Lighting—Description of Post System at Atlanta, Ga.

Ornamental street lighting was the subject of a report of a special committee appointed by the National Electric Light Association, and although this report was presented several months ago, we believe it remains the most comprehensive statement which has yet appeared. We therefore present the body of the report entire herewith, except that we have omitted the tables, as our own tables appearing in this issue are more up to date, being from special reports of lighting officials made to us within the last month.

The report of the committee referred to, of which W. R. Collier was chairman, is as follows:

REPORT OF COMMITTEE ON ORNAMENTAL STREET LIGHTING.

The subject of "Ornamental Street Lighting" has been taken up by the central stations so actively during the past year that it is practically impossible to prepare a paper that will even begin to cover all systems or even the most approved of the large systems. On this account the object of this paper will be simply to gather as many data as possible on the subject and present them in such form that they can be easily discussed; attempting at the same time to present briefly the advantages of the different systems in common use.

In the first place, there will be a great difference in opinion regarding exactly what constitutes a strictly ornamental system of lighting. In brief, such a system may be described as one where the beauty of the system by day and by night and the spectacular effects ob-

tained are of great importance as well as the actual efficiency—in other words, where a part (perhaps a smaller part) of the light is chargeable to illumination and a part to advertising.

With this distinction before us, it becomes a somewhat easier task to decide what installations can be classed truly as ornamental.

The three systems in common use at present for ornamental street lighting are the arc system, the festoon or arch system and the post system using tungsten lamps.

ARC SYSTEM.

In this system either the magnetite or flame arc is used almost universally. Such systems, as those in Toledo, Ohio, and St. Louis, Mo., are typical of the use of the magnetite lamp, and there is little doubt that all would class these systems as ornamental.

In Newark, N. J., we have an example of the use of the flame arc for ornamental lighting, while in Boston we see an entirely different system of flame-lamp illumination, and it is truly doubtful if the Boston installation can strictly be classed as ornamental.

The main advantages of the arc system are the ease with which it can be made extremely spectacular, its very high efficiency and its low cost of maintenance. The illumination is brilliant and intense and from a strictly advertising standpoint the effects obtained are most satisfactory.

The first cost, however, of such a system, if the lamps

are placed very close together, and the fact that to obtain a very even degree of illumination there must of necessity be an extravagant use of light, have prevented this system from becoming extremely popular. It is fair, however, to predict that within a few years such systems will be installed in a number of cities throughout the country, especially as the flame lamp has now been brought to such a stage of perfection.

The following is a partial list of cities using this system:

Newark, Ohio, Buffalo, N. Y., San Francisco, Cal., Newark, N. J., Louisville, Ky., Boston, Mass., Syracuse, N. Y., Toledo, Ohio, Philadelphia, Pa., Baltimore, Md., St. Louis, Mo., Detroit, Mich., Pittsburgh, Pa., Washington, D. C., Cleveland, Ohio.

THE FESTOON SYSTEM.

The idea of ornamental festoon lighting is now new, many cities having used it for a number of years, but few new installations are now being made. In fact, we are informed by a number of central stations now using the festoon method of lighting that in the near future it is to be abandoned in favor of a more permanent system.

While the festoon lighting is very attractive at night, there are several drawbacks to this system, among which may be mentioned the following: The system, whether it be a series of arches built of steel work or of arches suspended from stranded wire, will begin to rust within a few years, and unless it be thoroughly overhauled at intervals, at a considerable cost, it becomes dangerous.

Another drawback is, that the system always appears to be temporary—as if erected for a carnival—and during the day instead of beautifying the streets really produces exactly the opposite effect. It is difficult also, unless the sockets of the lamps are rigidly supported on framework, to make the lamps remain in regular positions, and a severe wind storm would not only cause the lamps to swing out of line, but increase the breakage to a great extent. In short, this system has certainly served its purpose—that of awakening the cities to a realization of the value of ornamental street lighting—but this purpose has now been accomplished, and the trend is towards a more permanent and more simple system—one that will be ornamental by day as well as by night.

Among the prominent installations of festoon lighting may be mentioned those of the following cities:

Mobile, Ala., Grand Rapids, Mich., Hobart, Okla., Wilmington, N. C., Columbia, S. C., Charleston, S. C., Lancaster, Pa., Charlotte, N. C., Fond du Lac, Wis., Canton, Ohio, Butte, Mont., San Francisco, Cal., Columbus, Ohio, Green Bay, Wis., South Bend, Ind., Birmingham, Ala., Appleton, Wis., Macon, Ga., Wilkes-Barre, Pa.

THE ORNAMENTAL POST SYSTEM.

This system, by far the most popular at present, is not really a new idea. In the days before electricity became most popular for street lighting, all cities using gas for street illumination adopted what was practically a counterpart of the present ornamental post system. The gas posts were never strictly ornamental, but they were located with a view of obtaining an even distribution of light with small units and at the same time with the idea of making the lighting to some degree decorative.

We are all more or less familiar, I believe, with the progress made in Minneapolis slightly over two years ago by the adoption of the ornamental post system. The success achieved by the installation of this system has resulted in a widespread adoption of it not only in the large cities, but also in some of the smaller towns where, until recently, no thought had been given to this branch of civic improvement.

The advantages of this system are many, the most important being permanence, beauty by day and night,

even distribution of light, comparatively low installation and maintenance cost and great advertising value.

Many forms and designs of posts have been adopted, but the post having tungsten lamps seems to be the most popular. In some cases three-light posts are used in the center of the block and five-light posts are used on the corners, while in Washington, D. C., we see the one-light post adopted.

The question as to whether the lamps should be upright or pendant is not of as great importance as it was a year ago, as tungsten lamps have been improved rapidly and the life of the lamp burning vertical is now practically as long as that of the pendant lamp. Where the voltage of the lamp is low (as in series systems) little trouble is experienced from the breakage of filaments, even with the lamps burning vertical and the socket mounted direct on the pole without spring support. Some stations claim that the globe breakage with lamps hanging pendant is great, due to the fact that high covered wagons driving close to the curb often strike against and shatter the globe; other stations claim that this expense is more than offset by the increased illumination obtained by using the lamp in a pendant position.

Numerous methods of wiring for the posts have been adopted. In a few cases the posts have been connected to an overhead system, but this detracts greatly from the beauty of the system and it is to be discouraged. The general practice seems to be that of placing the wires in iron or fiber conduits laid in a shallow trench just inside of the curb line, or in the gutter, making taps to transformers or the underground system at regular intervals.

In some cases the lights are turned on and off at the station either by direct switches or by remote control switches; in other cases time switches are installed, these switches each controlling one section of the system. The most popular method of controlling the lights, however, seems to be by patrol.

As an example of a recent installation may be mentioned the one at Atlanta, Ga. Here the system covers approximately 13,000 feet and has a total of 239 ornamental posts, each post carrying five 100-watt tungsten lamps in opal globes. The system covers seven of the principal streets in the center of the city, these streets being in the retail district.

Practically throughout the entire system the wires for each block were laid in one-inch conduit in a shallow trench next to the curb, the trench then being filled with concrete. The conduit was continuous from post to post, each post being wired in parallel on a 230-volt, direct-current underground system, with the five lamps of each post in series of 230 volts. In some cases the conduit was supported on the wall of basements, where the basement extended under the sidewalk, and in several cases it was found necessary to lay the conduit in the gutter.

The bases for the posts were cheaply made of concrete, the bolts for holding the posts being set in the concrete and being properly located by means of a wooden form.

The mains supplying the lamps on each side of the block were connected either direct to the underground distributing system at a manhole or to the bus-line of some building in the block, where such a line was large enough to carry the load. In the base of one corner post on each side of the block was placed a combination double pole switch and cut-out, this switch controlling all posts on one side of the block.

To provide for temporary festoon lighting, if such is wished at any time, each post has a tap brought out of the underside of the outside arm. Posts directly across the street are tapped for opposite polarity, the same be-

ing true of alternate posts on the same side of the street. With this arrangement, lines of low voltage, low candle-power lamps may be festooned in series either across the street or from post to post at the curb line, at a very low cost.

After the posts were erected it was found that moisture formed and was caught in the globes and collected in the ornamental tips of the arms. This was not discovered until after the first freeze, when a number of the ornaments were broken by the freezing water. All of the arms then had a one-fourth inch hole drilled at their lowest point and no further trouble has been experienced.

The installation of this system was paid for by the property owners and tenants along the streets where the system was installed, payments being based upon a total cost of \$1.92 per front foot; 96 cents being paid by the property owners and 96 cents being paid by the tenant.

When the system was completed it was turned over to the city, which contracted with the central station for the lighting of the posts at the rate of \$45 per post per year, this to cover cost of current, lamp and globe renewals, turning lights on and off, washing globes twice each month and painting posts once each year. The lamps are burned from dusk until midnight every day, a total of approximately 2,000 hours per year.

List of cities using ornamental posts is as follows:

Aberdeen, S. D., Albert Lea, Minn., Atlanta, Ga., Aurora, Ill., Beloit, Wis., Billings, Mont., Buffalo, N. Y., Champaign, Ill., Chicago, Ill.; Cheyenne, Wyo., Columbus, Ohio, Davenport, Ia., Dayton, Ohio, Decatur, Ill., Des Moines, Ia., Duluth, Minn., East Pittsburgh, Pa., Evansville, Ind., Faribault, Minn., Fort Atkinson, Wis., Fort Dodge, Kan., Fort Wayne, Ind., Fort William, Ont., Gary, Ind., Grand Forks, N. D., Grand Rapids, Mich., Great Falls, Mont., Grinnel, Ia., Hamilton, Ont., Hannibal, Mo., Hoopestown, Ill., Indianapolis, Ind., Jacksonville, Fla., Joliet, Ill., Kokomo, Ind., Lansing, Mich., Lincoln, Neb., Los Angeles, Cal., Macon, Ga., Milwaukee, Wis., Minneapolis, Minn., Mishawaka, Ind., Mobile, Ala., Montgomery, Ala., Mt. Clemens, Mich., Nashville, Tenn., Nashwauk, Minn., Newark, Ohio, New York City, Oakland, Cal., Omaha, Neb., Pasadena, Cal., Peru, Ill., Portland, Ore., Racine, Wis., Richmond, Va., Rockford, Ill., Salt Lake City, Utah, Sandusky, Ohio, San Diego, Cal., San Francisco, Cal., Savannah, Ga., Schenectady, N. Y., Seattle, Wash., Seneca Falls, N. Y., Shawnee, Okla., Spencer, Ia., Spokane, Wash., Springfield, Ill., Superior, Wis., Syracuse, N. Y., Tacoma, Wash., Terre Haute, Ind., Urbana, Ill., Vancouver, B. C., Victoria, B. C., Virginia, Minn., Warren, Ohio, Washington, D. C., Wausau, Wis., Winterset, Ia.

IN GENERAL.

There is one vital question in the installation of ornamental street lighting that has not been standardized and this question is of the greatest importance to the commercial section.

We refer to the question of who should pay for the installation of the system, who should pay for the maintenance, what should be the form of agreement and what the best method of obtaining signatures.

Various methods of payment have been adopted. In some cases the Merchants' Association pays for the installation and its maintenance, in other cases the city pays for the maintenance and the Merchants' Association pays for the installation, in other cases the property owners alone pay for the installation and in still other cases the city levies a special tax to cover the installation of the system and its maintenance. Local conditions must decide the question of who pays; in every case the answer being, "The parties who are most anx-

ious to get the light." The only warning that need be given along this line is that against receiving the individual signatures of the merchants in the street for the maintenance. After a short time, if such a course is followed, the central station will find that, due to some merchants moving and others becoming disinterested in the system, only a small amount of the money due can be collected and the company's only recourse will be to turn out part or all of the lights, thus destroying the beauty and utility of the entire system. If possible, make contract with the city or the Merchants' Association; if this is impossible, make contract with one or two responsible merchants in each block and let them look after the individual collections.

Regardless of who pays, the unit of payment should be the front foot, and this also should be made the unit of cost of installation. The reason for this is that if the post is made the unit of payment of installation, unequal length of blocks may place unequal burdens upon tenants and property owners on the same street, and this always causes dissatisfaction. Of course, where a contract is made with the city for the maintenance of the system, a cost per lamp or per post can be made without encountering difficulties mentioned above.

As a matter of caution, all central stations soliciting ornamental street lighting should do so, if possible, with their own solicitors. If this work is done by some outside party complications are almost certain to arise. Outside solicitors cannot be well acquainted with local conditions; the chances are that they will not understand the local feeling and that they will not follow closely the policy of the central station. These conditions, coupled with the fact that such solicitors may make statements and promises that the central station cannot fulfill, will surely cause dissatisfaction and loss of money when the time comes to collect for the installation or maintenance of the system.

MUNICIPAL LIGHTING IN PITCAIRN.

The municipal lighting plant of the borough of Pitcairn, Pa., has been in operation about ten years. The borough clerk, J. H. Travis, to whom we are indebted for the information following, says: "We think we have one of the municipal plants which has not (at least as yet) proven a failure, and two of the reasons for its successful operation so far are these: all services metered, and elimination of politics from the management of the plant." The population of Pitcairn is about 5,000.

At present the street lighting extends over about 5 miles of streets; 53 A. C. series arc lamps, 6.6 amperes, and 25 Tungsten lamps are used, burning 5,466 hours in the year. The arc lights are on poles 20 ft. above the street surface. In addition to this, each consumer is allowed the use of one 60-watt Tungsten lamp (or any other not exceeding 60-watt) on his front porch without charge for current, the current for this lamp being taken from the line before passing through the meter. This adds to the illumination of the street.

The plant has cost about \$35,000. It consists of two 125 h. p. Walrath gas engines, belted to two Westinghouse 90 k. w., 60 cycle, 2,200 volt S. P. generators and one 85 h. p. Westinghouse gas generator. Natural gas is used, costing from 28½ cts. to as low as 15 cts. per M. ft., the rate depending upon the amount used.

At the time the plant went into service the rate for street lighting was fixed at \$50 per arc lamp per year, \$25 less than a private company proposed to charge for the same service—every night all night—and this rate is still received by the department. The regular rate established by ordinance is 10 cts. per K. W. hour for all kinds of service, discount of 30 per cent. allowed for

prompt payment of all bills amounting to less than \$8 at the regular rate; 35 per cent. on all bills amounting to \$8 and less than \$10, and 40 per cent. on all bills of over \$10. Two large school buildings are furnished current free, although their service is metered and bills sent out for current used, same as for any other consumer. Warrant returning the amount paid for this service is sent the school board each month and the amount charged to operating expenses. The school board furnishes transformers and meters used for their service and the lighting plant makes use of the same transformers for their regular consumers. Bills are rendered for lighting schools merely for the purpose of getting credit for all current supplied from plant.

In calculating cost we take into consideration the salaries of employes, interest on bonds issued to build plant, rent of room occupied by the plant (the plant is located in the basement of the municipal building, but a charge of \$25 per month is made against the plant for the use of this room, and this is paid from earnings), repairs to machinery, lines, etc., as well as all other expenses except those for additions and betterments.

All money earned by the plant, over and above the amount required for operating and maintenance expenses, is placed in a ledger account as reserve for depreciation of the plant, and at this time there is about \$15,000 credit on this account.

INDIANAPOLIS ORNAMENTAL LIGHTING

Standards Carry Five Tungsten Lights Each—Occupants Pay for Lighting—Method Not Satisfactory to Lighting Companies.

By H. S. O'BRIEN.

Indianapolis has had ornamental street lighting for three years in the larger part of the business section, and her merchants, who pay the cost, regard it as a profitable investment. Under the old system, with electric lights at street intersections only, this part of the city had a forbidding appearance at night, with the few people abroad afraid to move from the two main streets, Washington and Illinois, the intersection of which was

the general meeting-place for all. Now thousands nightly visit the several streets illuminated with the group lights the window displays of the stores being a chief attraction. The boulevard lights have also been a fine advertisement for the city.

The Commercial Club was largely responsible for the campaign for this special illumination of the streets and once a sample group or two of lights were installed, the merchants fell in rapidly with the idea and the two lighting companies got very busy in pushing the canvass. There was some little friction on account of preferences of merchants for the lighting companies, with the result that both companies lost out in some odd blocks and these are not lighted. One-fourth of Circle street, the center of the city, which surrounds the famous Soldiers'



MASSACHUSETTS AVE., INDIANAPOLIS, BY NIGHT.

and Sailors' Monument, is unlighted, as are the first block of north Pennsylvania street and of south Illinois street.

Washington street, the main retail thoroughfare, is lighted for one mile; Massachusetts avenue, also a retail street, for three-quarters of a mile; south Meridian street, the wholesale district, one-fourth mile; Illinois street, retail, two blocks north and one south; Pennsylvania street, retail, one-and-one-half blocks; Virginia avenue, retail, one block; and there are other parts of blocks lighted. Both companies use a twelve-foot standard, one foot, one-and-one-half inches base diameter, five tungsten lights of 100 watts. One company uses a cast-iron post of 500 pounds weight, made by J. R. Mott & Co.; the other, the Jandus built-up post, with an 18-inch cast-iron base and a sheet steel column, one-eighth inch in thickness, bolted from bottom to top.

Twelve-inch alba glass globes are used for the four pendant lights, with a sixteen-inch globe



CAST IRON STANDARD.

for the upright. The wiring is all underground, in vitrified clay conduits, put in under the pavements. The posts installed complete, including the standard, lamps, glassware, conduit and wiring, cost \$115 each. The standards are placed on both sides of the street, 85 feet apart, a distance which has been found the best both for uniform lighting and proper ornamentation. There are four posts at each street intersection, one on each corner. The lights are lit from a half-hour after sunset until midnight the year round.

The occupants of the buildings abutting on the lighted streets pay for the lighting, \$1.10 a year for each front foot. The contracts are for five years. This method of getting pay for the lights has not proved satisfactory to the companies. They lose about twenty-five per cent. of their total charges for the lights on account of change of tenants, failures, lack of interest and dissatisfaction because the posts do not happen to come in front of every particular business place, in their distribution of one to every 85 feet of street, on each side. The Indianapolis lighting companies say that cities should pay for ornamental street lighting in the downtown district. These companies have \$100,000 invested in this lighting.

"WHITE WAY" FOR A SMALL CITY.

Cedartown, Georgia, with a total of only 5 miles of streets lighted, has in course of installation a "white way" consisting of 50 standards spaced 80 feet apart, each carrying 3 mazda lamps. The owners of abutting property stand the expense of installation—80 to 90 cts. a front foot—while the municipal plant will furnish the current free. The two bottom lamps will burn until 10:30, the top lamp all night.



MASSACHUSETTS AVE., INDIANAPOLIS, BY DAY.

MAZDA LAMP STREET LIGHTING

Characteristics and Life—Low and Intensity Lighting— Distribution and Installation—Lamp Devices— Ornamental Lighting.

By A. L. CHAPIN.

For the electric lighting of streets there are at the present time two forms of illumination, the arc lamp and the incandescent lamp. The first came into use about 1880, while the latter was not generally adopted for street lighting until several years after. Extensive improvements have been made in each illuminant and the field of each has been so extended as to overlap in many cases. Broadly speaking, however, the Mazda lamp is the more economical unit in residential, suburban, park and boulevard lighting, while the arc lamp is adapted to the lighting of wide main thoroughfares where a comparatively high intensity is desired. However, the lighting of the latter class of streets, in a great many cities, has recently assumed an ornamental aspect, in addition to its utilitarian purpose, and here again the incandescent lamp has proven its fitness.

REQUIREMENTS FOR GOOD STREET ILLUMINATION.

Though the ornamental lighting of the downtown streets attracts the more attention, adequate lighting of the residential and suburban districts is necessary for the convenience and safety of the citizens, and in fact is as important a part of the city government as any other civic duty. In this field the mazda lamp is unexcelled. A successful installation for this kind of lighting must meet the following requirements:

1. A sufficient amount of light must be supplied and so distributed as to give a uniform illumination.
2. The lamp units should have as low an intrinsic brilliancy as is compatible with economy, and be so located that any glare will not interfere with ordinary vision.
3. The greatest intensity of light should be at an angle of about 20° below the horizontal, with the usual height and spacing used in street lighting.
4. The light should be steady, for flickering obviously reduces the illuminating efficiency of the lamps.
5. There should be good diffusion of the light rays so as to avoid deep shadows.
6. The lamp should be placed fairly high, thus giving more light at the distant points and avoiding long distorted shadows of objects on the roadway.

CHARACTERISTICS AND LIFE OF THE MAZDA LAMP.

The mazda lamp possesses those characteristics essential to the lighting unit in a good installation. From the illuminating standpoint its virtues are: desired amount of light per unit; a steady light with no flickering or wavering; a color value near to that of daylight, which prevents any freakish distortion of color, and makes objects appear in a warm and pleasing light, suggesting comfort and life; a relatively low intrinsic brilliancy which reduces glare to the smallest possible value, affording better vision than is often obtained with a brilliant light source; and the ease with which it may be equipped with a radial wave reflector so as to give good diffusion and the greatest intensity of light near the horizontal.

From the operating standpoint this lamp is desirable as it has a low maintenance cost and a long burning life. It can be installed in places where it is subjected to considerable vibration, as the new drawn wire filament has greatly increased the strength and durability of the mazda lamp. The worry, care and expense of frequent trimming, together with annoying repairs for moving parts is entirely eliminated, and a reliable, continuous and inexpensive service is assured. They will operate

equally well on either direct or alternating current of any commercial frequency. This permits the use of that current which can be most economically generated and transmitted under local conditions. Furthermore, it permits connection of the lamps to circuits already installed.

These lamps can also be operated with complete satisfaction in series with magnetite arcs, provided lamps are selected whose normal ampere rating is equal to that of the average current flow of the circuit. On account of the high efficiency at which the lamp operates, the actual amount of energy consumed is low for the quantity of light given out. Even more important, however, than the actual watts per candle efficiency is the high illuminating efficiency of the mazda system. This is due to the large number of sizes in which the street series lamps are made, and to the ease with which lamps of different candlepowers may be connected to the same circuit, giving at each point only the desired amount of light flux. The energy saved by using a small lamp at one place can be used for a large lamp to increase the illumination at another place. Therefore, the maximum benefit is secured from all of the energy and the best possible distribution of light is obtained, resulting in a high illuminating efficiency. The only requirement is that all lamps upon one circuit should have the same ampere rating.

The Edison mazda lamp is a very satisfactory illuminant in maintaining its candlepower and brilliancy practically constant throughout life. As shown by the curves (Fig. 1), the candlepower of the carbon lamp drops to

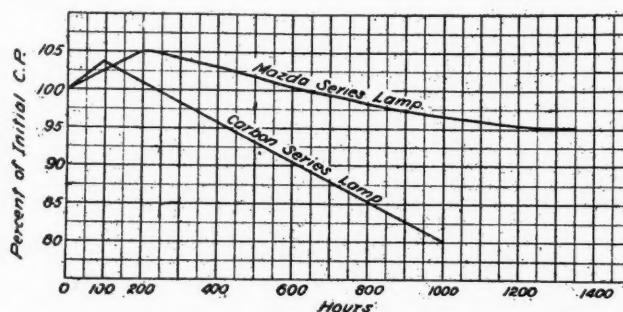


FIG. 1. VARIATION IN CANDLE-POWER DURING LIFE OF MAZDA SERIES AND CARBON SERIES LAMPS.

80 per cent. of its original value in 1,000 hours, while the mazda lamp drops only to 95 per cent. of its candlepower during its rated life. The drop of 5 per cent. during rated life is so slight that it is hardly noticeable, and can be measured only by accurate instruments.

UNIFORM ILLUMINATION OF A LOW INTENSITY.

Uniform intensity of light is perhaps the most important requisite in a good street lighting installation, as then the highest efficiency of vision is obtained and the eye is not required to accommodate itself to varying conditions. On account of the low maintenance cost of this lamp and the availability of small candlepower units, an exceptionally uniform illumination of an intensity about that commonly used in street lighting can be secured for a lower operating cost than many of the high candlepower units.

If there is an installation giving a certain minimum normal intensity at the midway points, and it is desirable to double the distance between the lamps without altering the minimum intensity, then, if the height of the lamps is also doubled, the light flux per unit must be four times as great as before, because the intensity from a given light source varies inversely as the square of the distance. Conversely, for the same minimum illumination with half the distance between lamps, the light flux per unit will be only one-fourth as great as with a corresponding decrease in the amount of energy consumed.

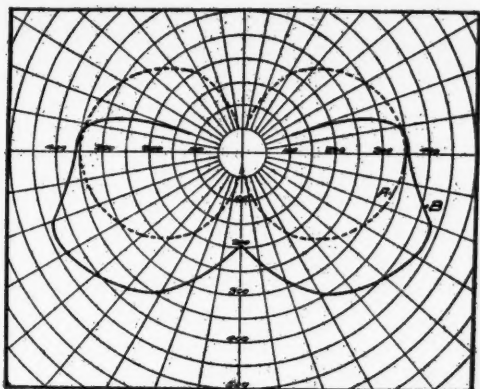


FIG. 2. PHOTOMETRIC CURVE OF 24-IN. RADIAL WAVE REFLECTOR WITH 350 C. P. SERIES MAZDA LAMP (CLEAR).

It will, therefore, be seen that considering only useful illumination and energy consumed, smaller lamps and more frequent spacing are best. But with every lamp unit there is a certain fixed charge, independent of the energy consumed. If the spacing is made too frequent this fixed charge per unit becomes larger than the energy charge per unit. There is accordingly a point where these two charges balance and the best lighting effect is secured for the greatest economy. The series mazda system with its availability of small units and low maintenance charges closely approaches ideal conditions.

HIGHER INTENSITY MAZDA LIGHTING.

There have recently been developed two new large size mazda units—200 and 350 candlepower. These additions to the series lamp schedule provide for the introduction of such lamps into downtown districts, and the lighting of entire cities from the same circuits. The series system with mazda lamps has long been recognized as the best method of lighting the suburbs, but on account of the lack of large size units it has not heretofore been extensively used in the congested districts where a high average intensity is desired. Since the introduction of the large units, the central station man can light every street from one equipment of a standard type, and at the same time supply the exact intensity of light desired in each locality.

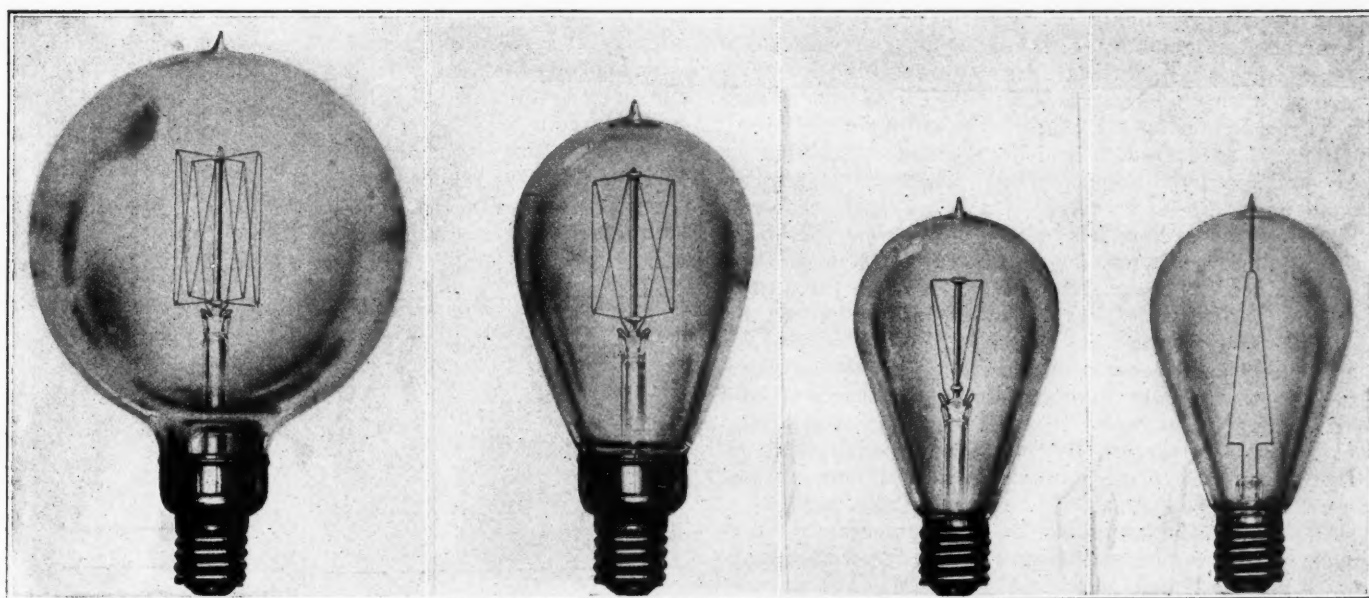
GENERAL PRACTICE IN DISTRIBUTION AND INSTALLATION

When a new installation for residential and suburban

lighting is being made the series method of distribution is usually chosen. This system offers a considerable saving in copper and a large reduction in transmission losses where there is a large area to be covered. It also offers an easier and more convenient method of control, as large groups of series lamps can be thrown on or off from the central station.

With the ordinary series installation for street lighting where there is no foliage or other obstruction to the distribution of the light, the lamps should be placed fairly high above the ground to secure a maximum amount of light at the distant points. If, however, the lamps are suspended too high what is gained in uniformity is lost in intensity. A lamp hung 20 feet above the ground gives but one-quarter as great an intensity directly under the lamp as the same lamp placed 10 feet above the ground. In determining the height, spacing, etc., of the illuminants for any installation where uniform intensity is desired, the amount of light at the midway points is the determining factor. In some places where the foliage of the shade trees is allowed to come within 12 feet of the ground the theoretically correct suspension of the unit would not be advantageous. Instead, the lamps should be placed so low as to be under the foliage. For every illuminant there is a certain spacing and height at which it will give the best results, depending upon the characteristics of the illuminant, the intensity desired, the distance between lamps, and the environment. Mazda lamps of from 32 to 100 candlepower, equipped with radial wave reflectors should ordinarily be placed at a height of from 12 to 18 feet, and larger candlepower lamps, with the same equipment, at a height of about 20 feet, while the distance between lamps should vary between five and ten times the mounting height.

For instance, upon a business street where the traffic is heavy, leaving out of consideration the ornamental feature, an installation of 200 candlepower lamps, with radial wave reflectors, 18 feet high and 100 feet apart, on each side of the street, or, 350 candlepower lamps, 20 feet high and similarly spaced, would be good practice. The actual size of the lamps used would depend upon the intensity desired. Upon a residential street sufficient illumination of a fairly even intensity would be supplied by 100 candlepower lamps, placed 15 feet high and 100 feet apart. If the foliage were dense and close



350 c. p., 4, 5.5 and 6.6 amp. ranges. 200 c. p., 4, 5.5, 6.6 and 7.5 amp. ranges. 100 c. p., 4, 5.5 and 6.6 amp. ranges. 80 c. p., 6.6 and 7.5 amp. ranges.

FIG. 3. MAZDA SERIES LAMPS, EACH JUST ONE-FOURTH ACTUAL SIZE.

to the ground, 60 candlepower lamps could be used, spaced every 60 feet, and placed at a height of about 12 feet, which will ordinarily clear the foliage. Upon streets where the traffic is not sufficient to warrant even an approximately uniform intensity, and where the spacing of the lamps depends upon the money available for lighting, the best results are obtained by using 32 or 40 candlepower lamps, placed 15 feet above the ground.

The lamps should always be equipped with radial wave reflectors. This reflector changes the distribution curve of the mazda lamp so that the maximum amount of light is given off at an angle of 20° below the horizontal instead of exactly at the horizontal. As a result, the actual illuminating efficiency of the lamp is increased 35 per cent. and uniform illumination is more easily obtained.

In most installations the lamp is placed at the side of the street, thus making the installation less expensive, keeping the light rays from shining directly into the eyes, and reducing the glare. The staggered placing of the units, that is, consecutive lamps on opposite sides of the street, assists in securing uniform illumination where the street is broad, but confuses the outline of the road where there are curves. Where tried out in competition with the lamps all on one side of the street it has not been found successful.

When a large number of lamps are used on one circuit, the higher ampere low voltage lamps are recommended, as the filaments of these lamps are larger and somewhat more hardy. For any given candlepower the higher the amperage of the lamps the lower their voltage. Therefore, the number of lamps that can be operated on any given secondary voltage is determined by the ampere rating of the lamps used. It is always desirable to keep the secondary voltage as low as possible, thus avoiding the cost of heavy insulation. By using the higher ampere, low voltage lamps, a large number of lamps of a given candle power can be supplied for less secondary voltage than is the case where lower ampere lamps of equal candlepower are used. The loss of energy in the transmission of the higher ampere current strength is not usually as great as the interest and depreciation on the cost of insulation for the higher voltage. The current strengths most generally used are the 4, 5.5 and 6.6 ampere ranges, with the largest demand upon the latter value. On account of the recent improvements in lamp manufacture it is now possible to supply all series lamps in certain definite standard ampere values. The current values selected are those around which the series production has naturally grouped itself in the past, namely, 3.5, 4, 5.5, 6.6 and 7.5. It is, therefore, recommended that all circuits be regulated so that the current values will be identical with the standard values used in street series lighting, preferably 4 and 6.6 amperes. By this improvement the central station can select all its equipment for one current value, making all apparatus interchangeable.

All size mazda lamps of the same ampere value are made with filaments of the same size wire; for example, all 6.6 ampere lamps, whether 32 candlepower or 350 candlepower, have wire of the same cross-section.

The larger candlepower lamps simply have a longer filament. Consequently, it is certain that every lamp filament will operate at the same temperature and same

efficiency, thus securing uniform brilliancy and most economical operation. Although the amount of energy wasted in the leading-in wires, etc., is practically constant for any current strength, the proportion of wasted energy to the total energy is larger in the smaller candlepower units than in the larger, so that the overall efficiency of the lamp, that is, watts per mean horizontal candlepower, will vary with the size of the lamp.

CONSTANT CURRENT TRANSFORMERS.

With series operation it is necessary to provide some method for maintaining the current at a constant value when the number of lamps varies and consequently the resistance of the circuit, or when the impressed voltage varies. There has recently been designed a new edgewise wound transformer, with concentric coils and cruciform core, in place of the old pancake coils and square core, giving better efficiency, higher power-factor, and closer regulation. It is so designed that the short-circuiting of the secondary at any time will not cause any serious damage. It will regulate from no load to full load within one-tenth of an ampere, above or below normal rated current on any primary voltage within 5 per cent. of the normal rated value. By means of a slight ad-

justment it can be adapted for any secondary current within $7\frac{1}{2}$ per cent. of normal rated value, thus allowing the customer to order those lamps which are not exactly the standard values.

The standard line of transformers are made for 1,100 to 2,200 primary volts 60 and 25 cycle circuits. The 60-cycle transformer can, however, be operated at fre-

quencies up to 125 cycles at a somewhat reduced output and the 25-cycle transformer up to 40 cycles. When the transformers are to be permanently used on a higher frequency than they were originally designed for, a tap can be put on the primary winding at a slight extra cost, which gives the transformer the rated output of this higher frequency.

Besides acting as a controlling device for keeping the current constant, the constant current transformer also

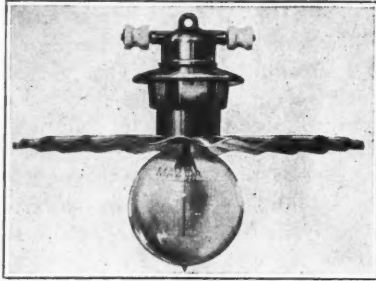


FIG. 4. 350 C. P. LAMP WITH CENTER SPAN SUSPENSION. RADIAL WAVE REFLECTOR.

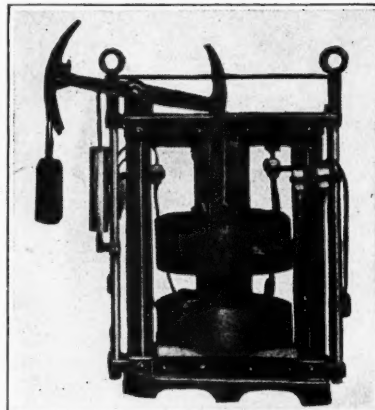


FIG. 5. EDGEWISE WOUND CONCENTRIC COIL CONSTANT CURRENT TRANSFORMER.

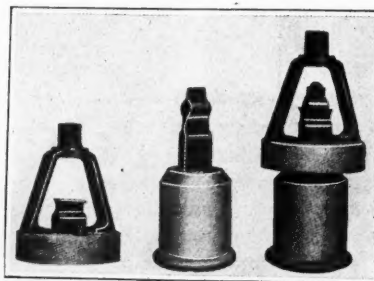


FIG. 6. PARTS OF SERIES SOCKET FOR INCANDESCENT LAMPS.

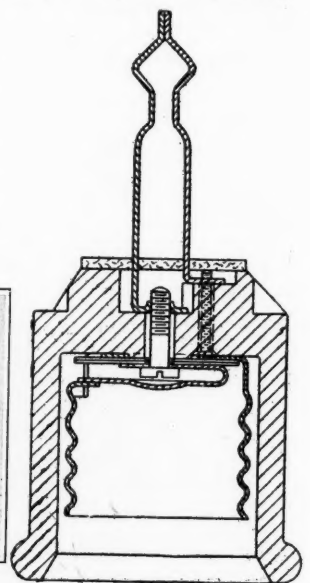


FIG. 7. SECTIONAL VIEW OF PORCELAIN SERIES SOCKET WITH CUTOUT.

also insulates the generating system from the incandescent circuit, thereby preventing a ground of the generating system in case the lamp circuit becomes grounded. If a ground occurs at two points in the secondary line, thus cutting out a large number of lamps, normal current still flows in the live part of the circuit after the secondary coil of the transformer comes to rest.

SOCKETS, RECEPTACLES AND CUTOUTS.

More important, perhaps, than any other device used in connection with the series incandescent system is the socket and receptacle. It is essential that the socket be so constructed that it will automatically short circuit the lamp in case of an open circuit, and that the receptacle permit a ready removal of the lamp from the socket without opening the circuit. For this purpose there has been designed a socket and receptacle which not only had these characteristics, but in addition makes the receptacle a part of the main insulator.

The socket is provided with a short circuiting spring contact, which, when the lamp is screwed into position, rests against the lamp base and prevents loosening by vibration. When the lamp is unscrewed the spring contact follows it in a downward direction, until the free end engages the screw shell of the socket, making a continuous circuit. The advantage of this arrangement is obvious. In the case of a burned out or broken lamp it is necessary to remove the socket in order to replace the film cutout. This being done the socket may again be placed in the receptacle without puncturing the film cutout as the circuit is completed through the spring contact mentioned above. The new lamp is then screwed into position and the circuit is complete through the lamp, instead of through the spring contact. It will, therefore, be noted that it is not necessary to place the lamp in the socket before placing the socket in the receptacle, and that the jarring of the filament which usually attends this operation, is eliminated.

A new aluminum disk film cutout has also been designed which will readily puncture at a low voltage, and thus effectually overcomes the trouble previously experienced with sockets burning out, caused by the failure of a mica or paper film to puncture when the lamp burns out or is broken.

The new cutout consists of two round aluminum plates 7-16 in. diameter, insulated from each other by a piece of chiffon veiling and held together by shellac baked under pressure.

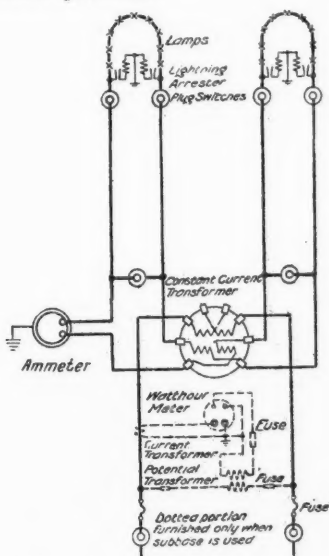


FIG. 8. DOUBLE CIRCUIT INCANDESCENT PANEL (DOUBLE SECONDARY TRANSFORMER.)

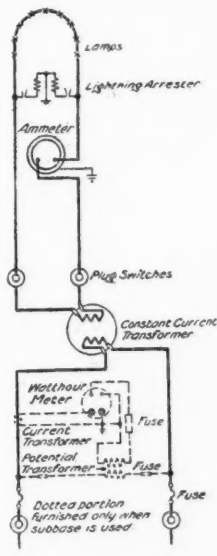
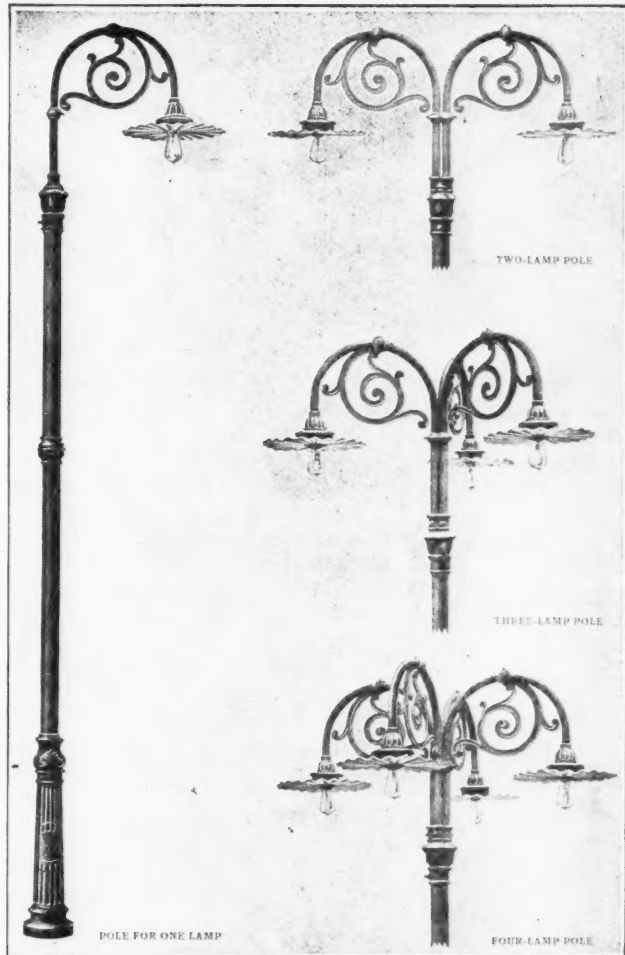


FIG. 9. SINGLE CIRCUIT INCANDESCENT PANEL (SINGLE SECONDARY TRANSFORMER.)



ORNAMENTAL POLES FOR SERIES INCANDESCENT STREET LIGHTING.

ORNAMENTAL STREET LIGHTING.

The idea of decorative street lighting has made such remarkable progress in all parts of the country since the first installation, about five years ago, that to-day there are approximately 250 cities that have a system of ornamental mazda lighting. The principal reasons for this increase can be briefly summarized as follows:

1. Increased trade, due to the power of light to attract people. Every increase in the number of people passing along the street means a corresponding increase in the number of people that see the electric signs and window displays.
2. Increased value of abutting property, due also to the greater number of people on the streets.
3. The substantial advertising given to the city thereby attracting industries and enlarging the population. That city which draws attention and appears progressive and flourishing naturally receives the first consideration as a new location for a factory.
4. The modern tendency toward the "City Beautiful" and the natural pride of the citizen for his native town.
5. The greater ease with which the police can accomplish their work, and the greatly increased safety of life and property where there is an abundance of light.

There are various other reasons that could be given for ornamental lighting, but all can be summed up in the two words—"it pays." The business man's judgment of a new project is always influenced by the interest returned from his investment, and that project which receives his prompt approbation must guarantee a good financial return. In this respect mazda ornamental lighting has proved to be an unqualified success.

GENERAL PRACTICE.

The intensity used in ornamental lighting varies

greatly with every installation, and is almost impossible to fix a standard value. Too low an intensity with dark spots between posts gives anything but a beautiful appearance, and utterly fails in attaining the purpose of ornamental lighting. Installations of such a character only bring discredit upon the entire movement, and the money spent for ornamental fixtures might better have been invested simply for more light. Neither should too high an intensity be allowed, lest the maintenance cost becomes too high, and the lighting effect garish and tiresome. Furthermore, a high intensity in street lighting is apt to discourage show window and sign lighting. The general practice requires 8 to 12 watts per linear foot of street, though installations have been made ranging in energy consumption from 4 to 20 watts per running foot of street. For ornamental lighting the lamps should be enclosed in opal globes thus obtaining a soft diffused light, which greatly adds to the appearance of the installation.

With ornamental lighting the multiple method of distribution has been more generally adopted on account of the convenience of using the commercial multiple lines, and thus avoiding the necessity of a separate series circuit. The multiple lighting from commercial circuits, however, requires a man to go around and turn off the lamps in small groups. As the ornamental lighting usually does not cover a large proportion of the total area lighted, the transmission losses are comparatively small and not as expensive as the interest and depreciation upon the investment necessary for requisite insulation upon the series system.

IMPROVED STREET LIGHTING IN UTICA, NEW YORK.

Luminous Arcs on Ornamental Standards—Wires Under Ground—Sixty-six Installed in Four Weeks.

On the night of August 20th, which was celebrated as "Utica Day," Mayor Frank J. Baker touched a button that flooded Genesee street with light from the new luminous arc lamps, which was the signal for the turning on of thousands of colored incandescent lamps, strung across the streets, outlining the various buildings, or enclosed in Japanese lanterns, used to decorate the city for the celebration.

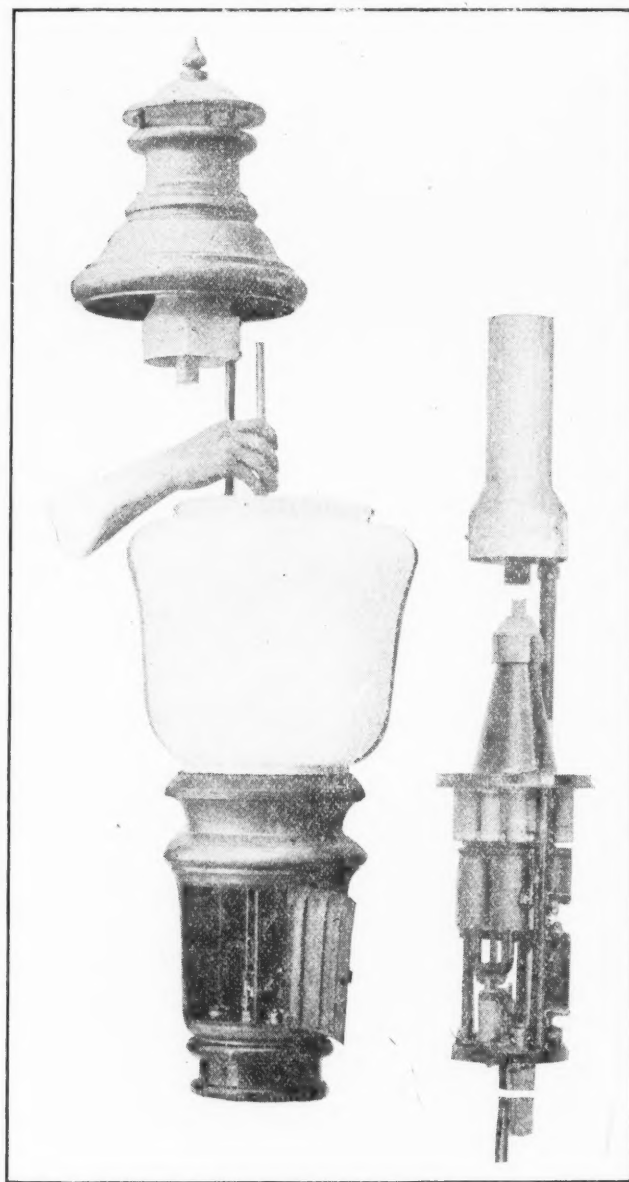
Last June, during the Conference of Mayors held in that city, the subject of street lighting was given considerable attention. A representative of the General Electric Company had installed in the committee room a miniature street illuminated with tiny lamps on ornamental poles. As a result of this meeting, a committee of the Chamber of Commerce canvassed the business section of Genesee street and sixty-six of the new lamps were ordered, only four weeks before they were lighted for the celebration. This remarkable record was made possible only by hard work on the part of the lighting committee from the Chamber of Commerce, composed of Messrs. Thomas W. Johnson, Edward Martin, John J. Booth, John White, and John Slauson, which had secured the co-operation of the business men on Genesee street, who bore the expense of the new lamps. The work of installing the lamps was in charge of A. T. Throop, general manager of the Electrical Department of the Utica Gas & Electric Company. A new cable was laid in the conduits along Genesee street and the work of installing the new arcs was pushed night and day so as to have them ready in time for the celebration.

The entire cost of purchasing the new arcs, ornamental poles and the construction of suitable concrete bases, is borne by the business men along Genesee street. The original cost was figured at \$2.00 a foot frontage. The

illuminating company took upon itself the burden of installing and connecting the new lamps. After the old arcs were taken away the cost for their maintenance was subtracted from the cost of maintaining the additional luminous arc lamps and, after January first, the city will provide in its annual budget for the maintenance of all the lamps.

The new lamps are mounted on the top of ornamental iron columns so that the casing which encloses the mechanical parts of the lamp seems to be part of the post and only the opal globe, standing fourteen feet six inches above the street, is visible. The posts are fluted and bronzed. The base of each post is eighteen inches square and the diameter of the column is eight inches at the base, tapering gracefully to approximately six and one-half inches at the top. The posts are placed at an average distance of about 100 feet apart, on alternate sides of the street, so that the light is very evenly diffused. Each post is securely bolted to a concrete foundation two and one-half feet square, set flush with the sidewalk. All connections are made in conduits, which were already laid. In this way all the wiring is concealed and the bronze post, capped with the white opal globe, is ornamental in appearance, even during the day when the lamps are not lighted.

It is claimed for these new lamps that the light distribution is of the best and the light is clear and white in



METHOD OF TRIMMING LUMINOUS ARC LAMP AND
VIEW OF ENTIRE LENGTH OF MECHANISM.



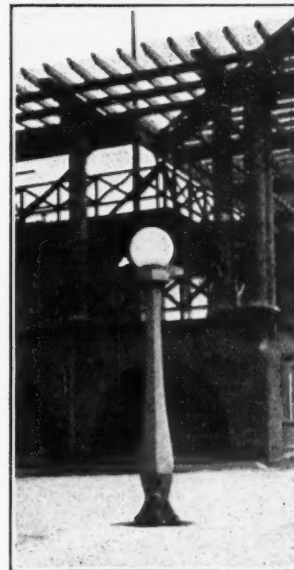
GENESEE STREET BY DAY.

quality, but without the dazzling brilliancy of other lamps, and that the lamps will burn from a hundred to a hundred and twenty hours without trimming and then only one electrode is replaced.

The installation on Genesee street is only the beginning. Already sixteen of the new lamps, to be mounted on eighteen-foot ornamental poles, have been ordered to be placed on the Parkway, a boulevard running from upper Genesee street to the new Roscoe Conkling Park. These lamps differ slightly from those installed in the business section. They will be placed higher in the air and "staggered" 475 feet apart along the Parkway. The globes will be arranged for wide angle distribution so that the Parkway will be one of the best lighted as well

VENICE CONCRETE LAMPPOSTS.

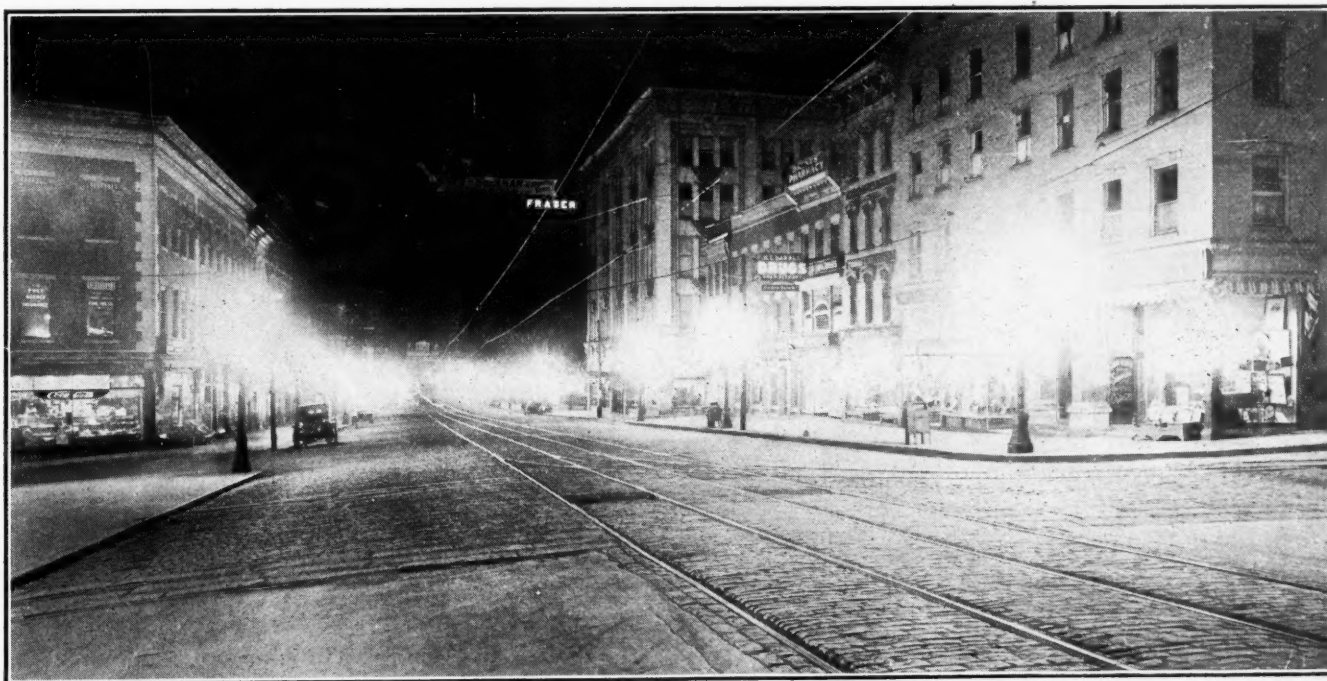
Venice, California, is now installing lampposts of concrete which are made in the city yards by its own employes. The posts are of unusually graceful lines, having a curved outline which somewhat resembles a slender vase. They are hexagonal, and the eight-foot shaft is surmounted by a simple capital bearing a single large globe. They have been set up in considerable numbers in the past few weeks and are placed at frequent intervals, so that the appearance of the streets on which they stand is greatly beautified. The design is certainly a great improvement on concrete lampposts, which as a general rule are rather crude, as a result the attempt to copy the style of metal.



CONCRETE LAMPOST.

A TRAFFIC CENSUS IN CHICAGO.

On Sunday, September 1, 1912, a traffic count was made between the hours of 7 A. M. and 9 P. M., on Sher-



GENESEE STREET ILLUMINATED WITH THE NEW LIGHTS.

as one of the most attractive streets in the city. The new lamps, which now extend to Bagg's Square, will be continued along the square to the depot and along the overhead bridge where Genesee street crosses the New York Central tracks. Sixteen of the new luminous lamps will be arranged along this bridge. The money for this work has already been appropriated. Fourteen will be installed along Bleeker street, lighting that thoroughfare for three blocks east of Genesee street. A number will also be installed in Lafayette street and along Seneca street. Other streets have evidenced a desire for the improved lighting and it is expected that within a year more than four hundred of the new luminous arc lamps will be installed in the city of Utica, making it one of the best lighted cities in the world.

idan Road boulevard, Chicago, at a point between Byron St. and Evanston Ave., with the following result:

Character of vehicle.	No. of vehicles.	Estimate, tons.
Horse-drawn pleasure vehicles, estimated ½ ton each	87	43
Bicycles, estimated at 150 lbs.....	187	14
Motor cycles, estimated at 300 lbs...	550	82
Automobiles, estimated at 1¾ tons..	6,765	11,838
Total	7,589	11,977
Width between curbs, 40 ft.		
Number of tons per foot of width, 299 tons.		

This stretch of street was paved with bitulithic in 1905, and is said to have received no repairs since that time.

Municipal Journal

Published Weekly at
50 Union Square (Fourth Ave. and 17th St.), New York
By Municipal Journal and Engineer, Inc.
Telephone, 2805 Stuyvesant, New York
Western Office, 144 Monadnock Block, Chicago

S. W. HUME, President
J. T. MORRIS, Manager A. PRESCOTT FOLWELL, Secretary
A. PRESCOTT FOLWELL, Editor
F. E. PUFFER, Assistant Editor

Subscription Rates
United States and possessions, Mexico, Cuba.....\$3.00 per year
All other countries..... 4.00 per year
Entered as second-class matter, January 3, 1906, at the Post Office at New York, N. Y., under the Act of Congress of March 3, 1879.

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Contributions suitable for this paper, either in the form of special articles or of letters discussing municipal matters, are invited and paid for.

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NOVEMBER 7, 1912.

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Municipal Electric Plants.

In the first article in this issue we describe a municipal plant which furnishes electricity for both lighting and power, which is believed to be one of the most successful municipal plants in the country; likewise one of the oldest. In this article we have endeavored to describe quite fully the business methods employed by the management as well as the physical features of the equipment; since it has come to be a common statement that a municipal electric plant to be successful must be operated on a purely business basis, as well as divorced from politics. Here we have a plant which has practically paid for itself out of the operating profits, at the same time furnishing current at rates probably as low as those in any city in the state. It is true that this plant benefits by advantageous conditions, among them being the concentration of a large number of consumers on a relatively small area, and that, in spite of its having begun active operations on Friday the 13th, it has suffered no adverse fortunes in the way of serious accidents. But the excellent showing which has been made cannot by any means be accounted for entirely by these conditions, but must be due to a great extent to the management;

and we recommend to all managers and municipal committees or commissions in charge of such plants a careful inspection of the management and bookkeeping methods employed in this plant.

We are not advocates of municipal ownership in general, as this journal considers its functions to be limited to presenting the facts as fully and in as unbiased a manner as possible. It appears to be a fact, however, that during the past few years the number of municipal electric plants has increased greatly, and there has been a remarkable dying out of the propaganda against municipal ownership and claims of its general failure.

The latest census statistics indicate that there are at present in the country about 1,700 municipal electric stations, the gross income of which is in the neighborhood of \$125,000,000 a year, 80 to 90 per cent. of which is from lighting, both public and commercial; and that the number of such stations has practically doubled in the last ten years, while the income has nearly quadrupled. One notable feature which is brought out by the census reports is that, while about 70 per cent. of the commercial plants employ water power, only about 12 per cent. of the municipal plants employ this power. This would naturally account for a greater average cost per horse power or k. w. h. of the current turned out by municipal than of that turned out by private plants. Another difference between the two, and one which would tend in the same direction of greater cost of municipal plants, is that while the average size of the municipal plant is about 25 horse power, the average of the commercial plant is nearly 400 horse power. The average output of the stations in kilowatt-hours is given as about 231,000 for the municipal plants and about 1,690,000 for the private plants.

The average just given would indicate that as great financial success in municipal plants as in private plants can hardly be expected until a greater number of the former furnish lighting and power to individual consumers, or greatly increase the commercial business which they have already developed. A plant which furnishes the current required for street lighting only, and during the hours of street lighting only, can hardly expect to make as favorable a financial showing, or compete with commercial plants where the equipment is in service practically 24 hours a day.

Paying for Ornamental Street Lighting.

In the article on ornamental street lighting in another column it is stated that a vital question, but one which has not been standardized, is, who should pay for the installation and who for the maintenance? Apparently the authors had in mind privately operated plants more particularly. In connection with the other data which we have collected and tabulated, and which appears this week, we collected some information on this point. Thirty-five cities in which ornamental lighting is furnished by private plants are represented, and 38 in which it is furnished by municipal plants.

Considering first the former, we find that the installation of the ornamental posts or other fixtures has been paid for as follows: By owners of property, 5; subscription by property owners, 1; merchants or other consumers, 4; one-half by consumer and one-half by company, 1; public subscription, 2; ladies' civic club, 1; merchants' association, 1; city, 4; lighting company, 5. The maintenance and current are paid for by the city in 16 cases, by the consumers in 8, by the property owners in 1, by the ladies' civic club in 1, and in one city the merchants pay for the four lower lights of a five-light post and the city for the top light.

(Continued on page 694.)

TABLE No. 1. DATA CONCERNING STREET ILLUMINATION—PRIVATE PLANTS

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps in use.	Nominal c. p. or amperes.	Hours burned per year.	Price per lamp p. above distance between.	Height above street, feet.	Method of supporting lamps.	Are wires in conduits?	Conduits under road or side walks?	Current by water or steam?	Cost of coal per ton.	Prices for commercial light. Max. Min.	Prices for commercial power. Max. Min.
ALABAMA:														
Greensboro	7	Mazda	75	80 c. p.	3,600	\$166.67	150	Goose-necks	No	....	Steam	\$3.20	\$20.00a	\$20.00a
Selma	...	Enclosed A. C.	120	7.5 amp.	3,600	66.00	20	.....	...	....	Steam	2.50	....	....
ARKANSAS:														
Little Rock	...	G. E.	9	6.6 amp.	3,000	90.00	2 blocks	Mast irons	No	....	Steam	2.00	....	....
COLORADO:														
Aspen	5	A. C. Enc. arc.	35	6.6 amp.	4,000	66.00	25	Span wire	No	....	Water	2.00	10.00	45.00b
Denver	200	Metallic flame arc.	2,500	60 c. p.	3,650	60.00	300 ft.	Extension hanger	No	....	Both	2.00	10.00	2.00
		Series Tungsten.	3,000	60 c. p.	3,650	28.00	50 ft.	Posts	No	....	....	....	....	....
		Carbon Filament.	267	7.5 amp.	4,000	28.00	100 ft.	Post hangers	No	....	Both	....	....	....
Colorado Springs	60	Series arcs.	267	100 watts	4,000	....	1 or 2 blks.	{ Span wires & Mast arms	No	....	Steam	1.10	12.50	10.00
Grand Junction	20	A. C. Series arc.	90	6.6 amp.	4,350	82.50	2 blocks	Span wire	No	....	....	....	10.00	4.00
CONNECTICUT:														
Bristol	17	Arcs	140	6.6 amp.	c	67.50	500 ft.	Poles & mast arms	No	....	Steam	5.00	15.00	10.00
Hartford	135	Magnetite arcs.	407	320 watts	3,960	60.00	1 block	Mast arms	No	....	Both	3.40	....	....
		Magnetite arcs.	178	125 watts	3,960	64.00	2 block	Brackets	No	....	Both	3.40	....	....
		Tungsten	1,561	125 watts	3,960	17.00	220 ft.	Brackets	No	....	Both	3.40	....	....
		Tungsten	69	125 watts	3,960	25.00	220 ft.	Brackets	No	....	Both	3.60	12.00	....
Stamford	...	Magnetite	96	6.6 amp.	4,000	85.00	...	Mast arms g	more than 1	....	Steam	....	....	....
		60 c. p. Mazda	860	6.6 amp.	4,000	20.00	...	Mast arms g	...	....	....	....	....	....
GEORGIA:														
Carrollton	10	Mazda	130	60	all night	24.00	...	{ Brackets and Span wires	No	....	Steam	3.00	10.00	6.00
		Mazda	8	200	all night	60.00	...	Span wire	No	....	Steam	3.00	....	....
IDAHO:														
Boise	...	Series A. C. enc.	342	6.6 amp.	4,000	60.00	450 ft.	Span wire	Partly	Both	Water	....	10.00	10.00
ILLINOIS:														
Athens	6	Tungsten	75	60 c. p.	1,500	24.00	12	Goose-necks	No	....	Steam	1.25	12.00	6.00
Cairo	18	Magnetite	125	40 c. p.	3,500	6.97	1,000 ft.	{ Span wire, mast arm & goose-necks	No	....	Steam	1.60	12.00	2.50
Lewistown	10	Series Incand.	190	6.6 amp.	moonlight	48.00	500 ft.	Span wire	No	....	Steam	2.00	12.00	....
		A. C. series	127	7.5 amp.	moonlight	60.00	760 ft.	{ Mast arm and span wire	No	....	Steam	1.55	10.00	9.00
Lincoln	...	A. C. series	21	60 watts	4,000	70.00	380 ft.	Span wire	No	....	Steam	....	....	3.00
Macomb	...	A. C. series	7	6.6 amp.	3,000	24.00	20	Span wire	No	....	Steam	2.05	10.00	4.00
Marengo	7	4 amp. Mazda	100	60 c. p.	3,800	18.00	1 block	Mast arms	No	....	Both	2.55	10.00	8.00
Ottawa	...	Enclosed arc.	167	7.5 amp.	3,800	60.00	400 ft.	Span wire	No	....	Both	2.10	13.50	6.00
Pinckneyville	...	Series	31	6.6 amp.	2,136	72.00	2 blocks	Span wire	No	....	Steam	0.85	10.00	3.00
Urbana	10	Series	135	6.6 amp.	2,136	65.00	600 ft.	Mast arms	No	....	Steam	1.75	15.00	6.00
INDIANA:														
Brookville	5	A. B. arcs.	35	6.6 amp.	2,550	68.00	412 ft.	Span wire	No	....	Steam	2.50	....	....
Kokomo	...	Mazda	250	4.8 amp.	2,500	19.90	400 ft.	Bracket on pole	No	....	Steam	2.50	....	....
La Fayette	...	Series encl.	425	2,000 c. p.	2,500	45.00	...	Mast arms	No	....	Steam	1.80	....	....
New Albany	15	Luminous Arc	308	4 amp.	4,000	55.44	300 ft.	{ Poles, mast arms and span wires	No	....	Steam	1.75	12.00	10.00
Noblesville	...	Arc	100	4.5 amp.	3,000	70.00	400 ft.	Span wire	No	....	Steam	1.75	10.00	5.00
IOWA:														
Cedar Falls	...	Series Mazda	263	6.6 amp.	2,300	12.00	330 ft.	.....	No	....	Steam	....	15.00	9.00
Cedar Rapids	...	Series arc.	265	6.6 amp.	2,300	63.00	330 ft.	.....	No	....	Steam	....	8.00	4.00
Council Bluffs	...	Arc	157	70 watts	4,100	60.00	1 block	Centre suspension	No	....	Steam	2.60	....	....
		Series inc.	554	60 c. p.	4,000	20.00	400 ft.	Centre suspension	No	....	Steam	2.70	14.00	9.00
		Series flaming	78	10 amp.	4,000	91.25	300 ft.	Centre suspension	No	....	Steam	2.70	6.00	3.00
		Series arcs.	703	10 amp.	4,000	95.00	250 ft.	Ornamental pole	No	....	Steam	2.70	....	....
Davenport	...	Magnetite	114	32 c. p.	4,000	65.00	250 ft.	Ornamental pole	No	....	Steam	2.70	....	....
Eagle Grove	...	Incandescent	114	32 c. p.	4,000	12.00	380 ft.	Mast arms	partly	Roadway	Both	2.00	10.00	8.00
Keokuk	...	Magnetite	221	6.6 amp.	4,000	60.00	380 ft.	Centre suspension	No	....	Water	2.00	12.00	10.00
Marion City	24	Magnetite	125	6.6 amp.	4,000	60.00	380 ft.	Centre suspension	No	....	Steam	2.25	15.00	8.50
Sheldon	5.3	60 W. Tungsten	9	220 volts	moonlight	21.00	1 block	Span wire	No	....	Steam	4.15	5.00	4.50
		Arcs	60	220 volts	moonlight	72.00	18-20	Poles	No	....	....	....	....	....
KANSAS:														
Arkansas City	...	Enclosed arc.	53	7.5 amp.	all night	78.00	...	Span wires	No	....	Water	....	....	....
Council Grove	...	100 W. series.	24	7.5 amp.	all night	39.00	...	Pole brackets	No	....	Steam	2.50	12.00	7.00
		Mazda	69	300 c. p.	4,380	28.00	450 ft.	Poles	No	....	....	....	6.00	....
		Arc	14	300 c. p.	4,380	84.00	300 ft.	Poles	No	....	....	....	....	5.60

TABLE NO. 1.—DATA CONCERNING STREET ILLUMINATION—PRIVATE PLANTS (Continued).

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps in use.	Nominal c. p. or amperes.	Hours burned per year.	Price per lamp per year.	Average distance between.	Height above street, feet.	Method of supporting lamps.	Are wires in conduits?	Conduits under road or side-walks?	Current by water or steam?	Prices for commercial light.		Prices for commercial power.		
													Max.	Min.	Max.	Min.	
KANSAS (Continued)																	
Olathe	10	A. B.-A. C.	34	6.6 amp.	moonlight	\$75.00	...	..	Mast arms	No	...	Steam	\$2.40	\$10.00	...	\$3.00
Parsons	...	Series Tungsten.	57	60 c. p.	moonlight	18.00	800 ft.	25	Gooseneck	No	...	Steam & gas	2.15	...	...	...
Washington	5	6.6 amp. series	119	2,000 c. p.	4,000	72.00	...	20	Span wire	No	...	Steam	3.55	10.00	...	...
	...	Series arc	21	6.6 amp.	1,800	24.00	...	16	Pole brackets	No	...	...	...	...	...	...
KENTUCKY:																	
Earlington	...	Enclosed arc	40	9.6 amp.	all night	45.00	400 ft.	25	Centre suspension	No	...	Steam	.90	8.00	7.00	...	
Versailles	3	Magnetite	31	4 amp.	3,200	75.00	...	25	Suspension	No	...	...	...	...	...	...
LOUISIANA:																	
Baton Rouge	20	Series A. C. arcs.	130	7.5 amp.	...	80.00	300 ft.	22	Mast arm	No	...	Steam	3.27	11.00	6.00	10.00	
	...	7.5 amp. series Mazda	13	40 c. p.	...	25.00	300 ft.	15	Brackets	No	...	...	...	...	...	5.00
Lake Charles	...	Enclosed A. C. arc.	76	6.6 amp.	4,000	84.00	800 ft.	25	Centre suspension	No	...	Steam	1.00h	15.00	10.50	3.00	
MAINE:																	
Ellsworth	10	Mazda	...	60 c. p.	moonlight	22.00	300 ft.	20-30	Brackets	No	...	Water	...	10.00	5.00	3.00	
Gardner	5.5	Series arc	40	6.6 amp.	all night	60.00	300 ft.	20	Change suspension and gooseneck	No	...	Both	5.80	9.00	...	2.00	
	...	75 W. Tung. series.	160	6.6 amp.	all night	30.00	200 ft.	15	Brackets	No	...	Water	...	12.00	5.00	11.87	
Pittsfield	...	40 W. Mazda.	213	32 c. p.	4,000	10.00	200 ft.	12	Brackets	No	...	...	...	...	...	...
MARYLAND:																	
Chestertown	4	Tungsten	96	32 c. p.	3,000	14.00	350 ft.	16	Pole brackets	No	...	...	...	...	...	...
MASSACHUSETTS:																	
Athol & others	65	Mazda	727	40 c. p.	...	20.00	250 ft.	18	Goosenecks	No	...	Both	4.20	16.00	8.00	10.00	
	...	Mazda	175	60 c. p.	all night	23.00	250 ft.	18	Goosenecks	No	...	Water	...	...	...	...
Gardner	...	75 W. Tungsten.	330	6.6 amp.	3,900	25.00	175 ft.	20	Brackets	No	...	Water	...	18.00	...	3.00	
Gt. Barrington	3	Flame arcs.	357	40 c. p.	1,900	18.50	375 ft.	16	Mast arm	No	...	Water	...	...	...	...
	...	50 W. Tungsten.	6	10 a.	midnight	70.00	100 ft.	28	Mast arm	No	...	Water	...	...	...	...
Hubbardston, etc.	...	75 W. Mazda.	198	6.6 amp.	4,000	20.00	175 ft.	20	Brackets	No	...	Both	...	13.00	10.00	...	
Lawrence	...	Enclosed arc.	615	5.5 amp.	4,000	90.00	...	15	...	No	...	...	...	...	...	...
	...	Magnetite	365	6.6 amp.	4,000	80.00	...	25	Mast arm	No	...	...	...	...	...	...
	...	Mazda	228	4 amp.	4,000	18.00	350 ft.	12-15	Brackets	No	...	Steam	4.00	20.00	3.00	...	
Lee	...	40 W. Tungsten.	930	30 c. p.	3,800	16.20	700 ft.	...	Brackets	No	...	Steam	4.20	...	10.00	3.20	
Pittsfield	...	Enclosed arc	122	3,000 c. p.	3,800	75.00	700 ft.	...	Mast arms	partly	...	...	...	...	...	...
	...	Flame lamps	225	2,000 c. p.	3,800	115.00	700 ft.	...	Mast arms	partly	...	...	...	...	...	...
	...	Enclosed arc	1,000	5 amp.	4,000	83.00	400 ft.	20	Mast arms	partly	...	...	...	12.00	8.00	6.00
Springfield	...	Magnetite	300	4,000	4,000	71.00	200 ft.	15	Gooseneck	...	...	...	...	...	...	...
	...	Tungsten	30	60 c. p.	4,000	15.00	200 ft.	...	Gooseneck	...	...	...	...	...	...	...
Worcester	231	Magnetite arc	1,008	400 W.	4,000	80.20	750 ft.	20-25	Pole, bracket, mast arm	70% 30%	...	Roadway Both	...	11.40	4.00	2.00	
	...	Mazda	1,640	75 W.	4,000	23.50	200 ft.	12-15	Mast arms	...	...	...	...	...	...	...
	...	Welsbach	570	65 c. p.	4,000	24.50	225 ft.	10-12	Iron post	...	...	...	...	...	...	...
MICHIGAN:																	
Ishpeming	...	Series A. C. arc.	68	6.6 amp.	3,250	80.00	400 ft.	25	Bracket & centre suspension	No	...	Steam	3.75	11.00	8.00	6.00	
	...	Mazda	135	6.6 amp.	3,250	30.00	400 ft.	25	Span wire	No	...	Steam	...	10.00	6.00	4.00	
Ludington	10	Enclosed arc.	50	7.5 amp.	3,000	60.00	...	...	Span wire	No	...	...	...	...	...	2.00
	...	Mazda	53	100 amp.	3,000	24.00	...	...	Span wire	partly	...	Water	...	10.00	...	5.00
Manistique	8	Arc	50	6 amp.	3,500	68.00	1 block	25	Mast arm	No	...	Steam	2.80	12.00	6.00	...	
Marine City	...	6.6 amp. series	17	6.6 amp.	48.00	400 ft.	...	25	Centre suspension	No	...	...	...	...	...	...
	...	Tungsten	125	50 c. p.	moonlight	17.50	400 ft.	...	Gooseneck	...	...	...	...	...	...	...
	...	Magnetite	95	32 c. p.	3,120	10.50	2 blocks	16	Span wire	None	...	Water	...	11.00	4.00	3.50	
Menominee	...	A. C.	27	4 amp.	all night	60.00	800 ft.	25	Suspension	...	...	Water	...	10.00	...	...
Reed City	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
MINNESOTA:																	
Eveleth	...	500 W. Mazda	50	432 c. p.	4,000	140.00	350 ft.	40	Brackets	No	...	Steam	3.10	12.00	6.00	8.00	
	...	Enclosed arc	20	6.6 amp.	4,000	96.00	350 ft.	40	Brackets	No	...	Water	...	...	...	6.00
Northfield	6	Tungsten	115	40 c. p.	all night	60-75	1 block	8	Pole	No	...	...	...	3.50	...	...
St. Cloud	...	Series arc	90	7.5 amp.	4,000	...	2 blocks	30	Span wire	No	...	...	...	10.00	4.00	2.00
MISSISSIPPI:																	
Bay St. Louis	10	Mazda	126	32 c. p.	...	22.50	500 ft.	16	Brackets	No	...	Steam	3.00	15.00	...	10.00	
Natchez	20	Arc	114	6.6 amp.	4,000	85.50	600 ft.	20	Chains	No	...	...	...	15.00	7.50	3.50
	...	Incandescent	37	6.6 amp.	4,000	57.00	600 ft.	20	Brackets	...	...	...	...	...	...	...
MISSOURI:																	
Boonville	10	Mazda	174	50	2,200	22.50	150 ft.	14	Poles	No	...	Steam	1.10	12.00	8.00	4.00	
Brookfield	...	50 W. magnetite.	125	5.5 amp.	moonlight	19.00	1 block	14	Mast arms	No	...	Steam	1.80	...	...	...
	...	...	38	2,000 c. p.	3,000	70.00k	2 blocks	18	Span wire	No	...	Steam	2.80	15.00	7.50	...
California	7	...	78	6.6 amp.	4,000	70.80	600 ft.	22	Span wire	No	...	Steam	2.30	15.00	10.00	2.50	

TABLE NO. 1.—DATA CONCERNING STREET ILLUMINATION—PRIVATE PLANTS (Continued).

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps in use.	Nominal c. p. or amperes.	Hours burned per year.	Price per lamp per year.	Average distance between, feet.	Height above street, feet.	Method of supporting lamps.	Are wires in conduits?	Conduits under road or side-walks?	Current by water or steam?	Cost of coal per ton.		Prices for commercial light.		Prices for commercial power.	
													Max.	Min.	Max.	Min.	Max.	Min.
MISSOURI (Continued)																		
Maryville	15	Series arc	52	6.6 amp.	2,534½	\$69.50	2 blocks	18-35	Span wire	No	....	Steam	\$2.95	\$15.00	\$7.50	\$10.00	\$4.00
40 W. series Mazda.			67	6.6 amp.	2,534½	15.00	2 blocks	18-25	Span wire	No	....	....	....	....	....	....	....
Neosho	5	Series arcs	45	6.6 amp.	4,000	21.00	2 blocks	20	Centre suspension	No	....	Steam	1.90	10.00	....	2.60	....
Series Tungsten ..			1,925	6.8 amp.	4,054	12.25 m	259 ft. n	15	Brackets	....	....	....	....	....	....	....	....
Magnetite	94	Magnetite	1,935	6.8 amp.	4,054	15	3 foot arm	15	3 foot arm	....	....	....	....	....	....	....	....
Welsbach	734	Welsbach	23,250	60 c. p.	4,054	5.62 m	165 ft.	10	Posts	....	....	....	....	....	....	....	....
MONTANA:																		
Anaconda .....	...	D. C. enclosed arc.	78	6.6 amp.	4,000	75.00	600 ft.	35	Span wire	No	....	Water	....	13.50	....	....	....
NEBRASKA:																		
Ashtland	4	60 W. Gems.	85	16	4,500	12.00	240 ft.	8	Pole	No	....	Water	....	14.00	7.00	....	....
Holdrege	7	Tungsten	100	75 W.	moonlight	1.50	250 ft.	27	Centre suspension	No	....	Steam	4.00	15.00	....	8.00	....
McCook	1.5	110 V. Mult. arc.	6	6 amp.	2,500	108.00	300 ft.	25	Cable	No	....	Steam	4.00	14.00	....	8.00	....
60 W. Mult. Incand.	...	60 W. Mult. Incand.	29	50 amp.	2,500	12.00	200 ft.	15	Gooseneck	No	....	....	....	....	....	....	....
NEW HAMPSHIRE:																		
Newport	8	Mazda	189	32 c. p.	2,000	8.00	200 ft.	20	Brackets	No	....	Steam	4.85	10.00	....	5.00	2.00
Arc	...	Arc	3	6.8 amp.	2,000	50.00	300 ft.	25	Span wire	No	....	....	....	....	....	....	....
NEW JERSEY:																		
Millville	15	Enclosed arc	145	1,200 c. p.	4,000	65.00	500 ft.	26	Brackets suspens'n	No	....	Water & gas	....	10.00	....	8.00	5.00
Ridgewood	40	Mazda	500	32 c. p.	4,010	19.00	360 ft.	15	Gooseneck	No	....	....	....	10.00	....	10.00	5.00
Washington	10.5	Arc	40	5.5 amp.	3,000	69.00	400 ft.	23	Span wire	No	....	Steam	3.35	15.00	7.50	10.00	5.00
Mazda	...	Mazda	20	60 c. p.	3,000	18.00	400 ft.	18	Brackets	No	....	....	....	....	....	....	....
Mazda	...	Mazda	20	60 c. p.	3,000	21.60	400 ft.	18	Brackets	No	....	....	....	....	....	....	....
NEW MEXICO:																		
Roswell	6	.....	32	6.6 amp.	2,100	96.00	450 ft.	21	Span wire	No	....	Gas	4.85	15.00	8.00	12.00	5.00
NEW YORK:																		
Bath .....	...	Metallic flame	72	4 amp.	all night	69.44	1 block	16-22	Span wire & mast arm	No	....	....	2.60	16.00	10.00	10.00	3.50
Canton	10	Luminous arc	42	6.5 amp.	2,200	55.00	1,200 ft.	20	Span wire	No	....	Water	....	10.00	....	6.00	3.00
Cortland	15	Arc	154	4 amp.	4,000	73.00	....	25	Span wire	No	....	Steam	2.70	10.00	5.75	10.00	1.75
Deposit .....	...	Incandescent	70	32 c. p.	3,500	12.50	....	12	Centre suspension	No	....	Both	2.70	15.00	6.00	....	....
East Aurora	18	Incandescent	36	32 c. p.	3,500	15.00	....	12	Gooseneck	No	....	....	....	....	....	....	....
Elmira	125	Tungsten	142	60 c. p.	moonlight o	15.00	....	12	Gooseneck	No	....	Both	2.50	14.00	....	2.00	....
Hempstead .....	...	Gas Mantle	347	75 c. p.	4,000	72.00	150 ft.	25	Suspension	No	....	Steam	....	10.00	2.00	....	....
Homer .....	...	Luminous arc.	52	4 amp.	every night o	47.45	300 ft.	20	Span wire	No	....	....	2.70	10.00	5.75	10.00	1.75
Ithaca .....	...	Enclosed arc.	138	6.6 amp.	3,650	75.00	100 ft.	12	Mast arm	No	....	Steam	2.00	10.00	5.00	6.00	3.00
Lockport .....	...	Series Incand.	200	60 c. p.	4,000	24.00	100 ft.	20	Mast arm	No	....	....	....	....	....	....	....
McGraw .....	...	Incandescent	431	6.6 amp.	4,000	55.00	300 ft.	18	Mast arms & cables	No	....	Water	2.70	10.00	5.75	10.00	1.75
Massena	15	Luminous arc.	60	4.4 amp.	every night p	11.11	....	10	Brackets	No	....	....	....	10.00	5.75	10.00	1.75
Oswego .....	...	Series Incand.	7	32 c. p.	4,500	55.00	....	16	Span wires and brackets	No	....	Water	....	11.00	8.00	....	2.20
Schenectady	117	Mazda q	371	6.6 amp.	4,500	15.50	....	16	Gooseneck and brackets	No	....	....	....	....	....	....	....
Utica	120	Luminous mag.	868	32 c. p.	4,000	66.00	300 ft.	21	Mast arms & span wire	No	....	Both	3.00	10.00	7.00	....	....
Watertown	30	Luminous mag.	44	4 amp.	3,960	60.00	500 ft.	16	Post	Yes	Sidewalks	....	....	....	....	....	....
...	...	Luminous mag.	44	4 amp.	3,960	60.00	500 ft.	16	Mast arm	partly	Roadway	....	....	....	....	....	....
...	...	Series D. C.	900	6.6 amp.	4,000	75.00	250 ft.	16	Trolley poles	Yes	Roadway	....	....	....	....	....	....
...	...	Magnetite arc.	338	4 amp.	4,000	65.70	400 ft.	20	Mast arms	partly	Roadways	....	....	10.00	5.50	6.60	1.47
...	...	Tungsten	38	4 amp.	4,000	30.00	....	15	Mast arm	partly	Roadways	....	....	4.30	10.00	2.00	....
NO. CAROLINA:																		
Wilmington .....	...	Series arc.	125	7.5 amp.	3,000	60.00	400 ft.	20	Span wire	No	....	Steam	3.25	....	....	....	....
Wilmington .....	...	Series Tungsten.	117	60 c. p.	3,000	23.00	400 ft.	18	Bracket	No	....	....	....	....	....	....	....
Wilmington .....	...	Gas lamps.	145	....	4,000	25.00	400 ft.	8	Post	....	....	....	....	....	....	....	....
NO. DAKOTA:																		
Wahpeton	10	Magnetite	21	4 amp.	4,000	120.00	132 ft.	20	Span wire	No	....	Both	4.75	....	....	10.00	5.00
Wahpeton .....	...	Magnetite	11	4 amp.	4,000	90.00	132 ft.	20	Span wire	No	....	....	....	....	....	....	....
Wahpeton .....	...	Series Mazda.	4	80 c. p.	4,000	30.00	132 ft.	11	Brackets	No	....	....	....	....	....	....	....
Wahpeton .....	...	Multiple Mazda.	4	200 c. p.	4,000	60.00	132 ft.	11	Concrete posts	No	....	....	....	....	....	....	....
OHIO:																		
Elyria	15	Metallic flame	230	4 amp.	3,760	64.00	600 ft.	25	Mast arm and span wire	No	....	Water & gas	....	10.00	3.00	6.00	2.00

TABLE NO. 1.--DATA CONCERNING STREET ILLUMINATION--PRIVATE PLANTS (Continued).

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps in use.	Nominal c. p. or amperes.	Hours burned per year.	Price per lamp per year.	Average distance between.	Height above street, feet.	Method of supporting lamps.	Are wires in conduits?	Conduits under road or side- walks?	Current by water or steam?	Cost of coal ton.		Prices for commer- cial light.		Prices for commer- cial power.	
													Max.	Min.	Max.	Min.	Max.	Min.
OHIO (Continued)																		
Franklin	6	Series arc	45	6.6 amp.	4,000	\$74.00	450 ft.	20	Span wire	No	....	Steam	\$2.00	\$14.00	\$4.00	....	....
Tungsten	11	100 W. Mazda	17	32 c. p.	4,000	21.00	375 ft.	18	Pole suspension	No	....	Steam	2.00	10.00	5.00	....	....
Glandorf	2.5	6.6 amp.	17	550 W.	all night	36.00	375 ft.	18	Bracket	....	....	....	....	6.00	4.00	\$2.50	\$1.50
Irononton	4	Enclosed arc	210	6.6 amp.	4,000	54.00	600 ft.	30	Span wire	No	....	Steam	1.75	12.00	....	4.00	....
Marysville	10	Magnetite	70	4 amp.	1,800	68.00	400 ft.	22	Span wire	No	....	....	....	....	....	....	....
Middletown	25	....	190	4.5 amp.	all night	60.00	500 ft.	20	Mast arms and span wires	No	....	Steam	.90	9.00	....	....	....
Mt. Vernon	25	Series enclosed	170	6.6 amp.	2,600	60.00	700 ft.	20	Span wire and mast arm	No	....	....	....	....	....	....	....
Ottawa	12.5	100 W. Mazda	86	6.6 amp.	all night	33.00	300 ft.	18	Cable	No	....	Steam	2.00	10.00	5.00	....	....
Piqua	10	Magnetite	9	550 W.	all night	75.00	300 ft.	18	Cable	No	....	....	....	....	....	....	....
Pomeroy	10	Mazda	200	4 amp.	4,000	70.00	250 ft.	25	Span wire	No	....	Steam	2.15	16.00	8.00	5.00	....
Salineville	5	Arc	32	32 c. p.	....	10.00	400 ft.	20	Brackets	No	....	....	....	....	....	....	....
Urbana	....	Enclosed arc	50	6.6 amp.	2,500	70.00	250 ft.	20	Poles	No	....	Steam	2.00	10.00	6.00	....	....
Van Wert	....	Enclosed arc	110	7.5 amp.	4,000	57.50	350 ft.	25	Span wire	No	....	Steam	2.25	10.00	4.00	5.00	2.50
Washington C. H.	10	Metallic flame	100	4 amp.	4,000	57.50	350 ft.	25	Suspension	No	....	Steam	2.70	10.00	4.00	5.00	....
....	....	Open arc	104	1,200 c. p.	3,000	60.00	600 ft.	24	Poles, arms and span wires	No	....	Steam	2.20	10.00	....	....	....
....	....	Magnetite	24	1,800 c. p.	3,000	65.00	400 ft.	24	Poles, arms and span wires	No	....	....	....	....	....	....	....
OKLAHOMA:																		
Enid	30	Series arc	146	7.5 amp.	4,000	66.00	800 ft.	22	Brackets and sus- pension	No	....	Steam	....	12.75	3.00	....	....
Sapulpa	12.3	250 W. series arcs.	109	6.6 amp.	3,000	60.00	2 blocks	20	Mast arms	No	....	Gas engines	....	12.00	5.00	5.00	....
Vinita	....	Series Tungsten	8	2,000 c. p.	3,000	42.00	450 ft.	25	Centre suspension	No	....	Steam	....	15.00	1.50	6.00	1.30
....	....	Flaming arc	8	3,000 c. p.	3,000	96.00	300 ft.	30	Brackets	No	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	Centre suspension	....	....	....	....	....	....	....	....
OREGON:																		
Astoria	15	Luminous	114	4 amp.	4,380	64.80	1 1/2 blocks	35	Mast arms	No	....	Steam	....	15.00	5.00	7.50	3.25
Fendleton	10	....	65	....	all night	60.00	....	..	Mast arms and span wires	No	....	Water	....	....	....	....	....
The Dalles	....	Series arc	35	6.6 amp.	all night	72.00	....	30-40	....	No	....	Water	....	11.00	6.70	13.00	7.50
PENNSYLVANIA:																		
Ashland	5	Arc	54	7.5 amp.	all night	85.00	250 ft.	19	Span wire	No	....	Steam	1.20	10.00	6.00	8.00	3.00
Bellefonte	7	D. C. multiple arc	60	2,000 c. p.	4,000	66.00	500 ft.	24	Brackets & cable	No	....	Steam	1.85	10.00	....	....	....
Blairsville	12	D. C. multiple arc	37	32 c. p.	4,000	21.00	500 ft.	18	Brackets	No	....	....	....	....	....	....	....
Blauensburg	16	Enclosed arc	54	9.6 amp.	2,500	60.00	500 ft.	25	Cable	No	....	Steam	1.20	10.00	5.00	3.00	2.00
Brifford	....	Series enclosed arc	116	6.6 amp.	4,000	65.00	450 ft.	18	Span wire	No	....	Gas	....	9.00	5.00	3.00	2.50
Doylesstown	10	Magnetite	158	4 amp.	4,000	65.00	....	18-40	Mast arms	No	....	Steam	3.15	15.00	10.00	4.00	....
....	....	Enclosed arc	60	2,000 c. p.	all night	70.00	....	12	Mast arms	No	....	....	....	....	....	....	....
....	....	Incandescent	60	40 W.	all night	35.00	....	18	Brackets	No	....	Steam	.92	12.00	....	5.00	....
Ligonier	5	Carbon incand.	110	16 c. p.	3,932	12.00	200 ft.	22	Mast arms	No	....	Both	1.85	15.00	....	8.00	....
Mauch Chunk	8	Magnetite	32	4 amp.	4,000	75.00	....	12	Mast arms	No	....	....	....	....	....	....	....
Meyersdale	3	Tungsten	81	60 c. p.	4,000	23.00	....	25	Gooseneck	No	....	Steam	1.35	....	....	....	....
....	....	Arc	28	6.6 amp.	all night	60.00	....	25	....	No	....	....	....	....	....	....	....
....	....	125 W. Gem	45	50 c. p.	all night	15.00	....	25	....	No	....	....	....	....	....	....	....
Pittsburgh	....	Series arc	3	100 c. p.	all night	24.00	....	25	Poles	Yes	Roadway	Steam	1.35	10.00	....	5.00	....
....	....	Magnetite	591	2,000 c. p.	4,000	72.50	....	23	Poles	No	....	....	....	....	....	....	....
Ridgway	15	Enclosed arc	320	2,000 c. p.	4,000	57.50	....	23	Mast arms	No	....	Gas	x	9.00	....	....	....
....	....	Luminous	27	4 amp.	4,000	62.50	....	18	Brackets	No	....	....	....	....	....	....	....
....	....	Series enclosed	140	80 c. p.	4,000	24.00	....	12	Mast arms	No	....	....	....	....	....	....	....
....	....	75 W. Tungsten	110	7.5 amp.	3,650	70.00	600 ft.	22	Mast arm and span wire	No	....	....	....	....	....	....	....
....	....	....	57	7.5 amp.	3,650	24.00	600 ft.	18	....	....	....	....	....	....	....	....	....
S. Bethlehem	....	....	128	4 amp.	4,000	76.00	500 ft.	25	Mast arm and span wire	No	....	Steam	2.75	11.00	6.00	8.00	2.60
Stroudsburg	....	Series arc	40	1,200 c. p.	all night	60.00	....	..	Brackets	No	....	Steam	2.35	10.00	6.00	....	....
RHODE ISLAND:																		
Westerly	....	Enclosed arc	23	6.6 amp.	4,000	68.00	300 ft.	20	Mast arm	No	....	Oil eng.	....	16.00	8.00	....	....
....	....	Series incand.	600	3.5 amp.	4,000	18.00	....	20	Gooseneck	No	....	....	....	....	....	....	....
....	....	Cluster	12	6.6 amp.	4,000	54.00	....	20	Mast arm	....	....	....	....	....	....	....	....

TABLE NO. 1.—DATA CONCERNING STREET ILLUMINATION—PRIVATE PLANS (Continued).

City.	Miles of streets lighted.	Kind of lamp.	Number in use.	Nominal c. p. or amperes.	Hours burned per year.	Price per lamp per year.	Average distance between street.	Height above street, feet.	Method of supporting lamps.	Are wires in conduits? walks?	Conduits under road or side-walks?	Current by water or steam?	Cost of coal per ton.		Prices for commercial light.		Prices for commercial power.	
													Max.	Min.	Max.	Min.	Max.	Min.
SO. CAROLINA:																		
Sumter	...	Series	100	6.6 amp.	all night	...	...	12	Span wire	No	....	Steam	\$3.30	....	....	....	....
SO. DAKOTA:																		
Mitchell	18	Magnetite	76	4 mp.	4,000	\$60.00	500 ft.	18	Suspension	No	....	Steam	4.75	10.00	8.00	\$6.00	....
Yankton	12	Enclosed arc	41	6.6 amp.	2,700	95.00	400 ft.	20	Span wire	No	....	Steam	2.40	15.00	....	8.00	\$5.00
TENNESSEE:																		
Bristol	...	Series arc	98	6.6 amp.	4,000	72.00	...	20-25	Bracket & centre suspension	No	....	Both	2.00	12.00	8.00	3.00	1.50
Clarksville	20	Multiple arc	50	6 amp.	3,000	66.00	900 ft.	20	Mast arms	No	....	....	....	12.00	....	6.00	3.00
...	...	Carbon incand.	84	48 c. p.	3,000	24.00	600 ft.	16	Cross arms	No	....	....	....	....	....	....	....
Mt. Pleasant	4	Carbon incand.	65	32 c. p.	3,600	24.00	300 ft.	18	Brackets	No	....	Steam	2.50	20.00	9.00	....	....
TEXAS:																		
Denison	45	Tungsten	358	60 c. p.	4,000	12.60	400 ft.	15	Gooseneck	No	....	Steam	2.45	15.00	3.50	....	....
Gonzales	8	Mazda	65	6.5 amp.	all night	24.00	400 ft.	25	Water	No	....	....	3.50	15.00	....	....	....
Groesbeck	...	Arc	6	6 amp.	all night	120.00	300 ft.	25	Centre suspension	No	....	Steam	1.94	10.00	....	....	....
Lockhart	...	40 W. Mazda	11	32 c. p.	...	12.00	350 ft.	20	Suspension	No	....	....	3.25	15.00	....	....	....
...	...	100 W. Mazda	8	80 c. p.	...	30.00	350 ft.	20	Suspension	No	....	....	....	....	....	....	....
Weatherford	...	Tungsten	50	60 W.	4,000	28.00	...	..	Centre suspension	No	....	Steam	3.25	15.00	4.00	....	....
UTAH:																		
Mt. Pleasant	7.5	Gem	100	4 amp.	4,078	57.00	780 ft.	21	Gooseneck	No	....	Water	....	10.00	....	....	....
Ogden	35	Metallic flame	250	...	...	...	...	...	Mast arm	No	....	....	....	....	....	....	....
VERMONT:																		
Bennington	18	Magnetite	1	6.6 amp.	3,900	100.00	...	20	Centre suspension	No	....	Both	4.65	14.00	7.00	10.00	3.00
...	...	Enclosed arc	11	6.6 amp.	3,900	75.00	...	..	Centre suspension	...	....	....	....	....	....	....	....
...	...	Open arc	39	6.6 amp.	3,900	75.00	...	..	Poles	...	....	....	....	....	....	....	....
...	...	Tungsten	91	60 c. p.	3,900	25.00	...	..	Bracket	...	....	....	....	....	....	....	....
...	...	Tungsten	35	32 c. p.	3,900	18.00	...	..	Bracket	...	....	....	....	....	....	....	....
VIRGINIA:																		
Norfolk	...	Series A. C. arc	520	6.6 amp.	4,000	58.00	...	18	Mast arms	partly	Roadway	Steam	2.45	10.00	....	9.00	....
...	...	75 W. Tungsten	500	6.6 amp.	4,000	22.00	...	18	Gooseneck	partly	Roadway	....	....	....	....	....	....
WEST VIRGINIA:																		
Sistersville	2	A. B. Multiple	15	6.5 amp.	4,000	80.00y	...	20-35	Mast arm	No	....	Gas	....	8.00	6.40	5.00	....
WISCONSIN:																		
Lake Geneva	...	Incandescent	105	32 c. p.	1,400	...	1 block	18	Suspended	No	....	Both	3.30	15.00	15.00	7.50	4.00
...	...	Enclosed arc	12	6 amp.	1,400	...	1 block	18	Suspended	No	....	....	....	....	....	....	....
Menominee	...	Enclosed arc	61	7.5 amp.	3,600	75.00	1 1/2 blocks	20-30	Centre suspension	No	....	Water	....	13.00	4.50	8.00	3.00
Merrill	20	33 V. Mazda	91	7.5 amp.	4,000	45.00	2 blocks	20	Span wire	No	....	Water	....	3.00	2.00	5.00	1.00
Monroe	10	Magnetite	70	7.4 amp.	3,000	65.00	2 blocks	25	Cable	No	....	Steam	3.00	10.00	6.00	....	....
Prairie du Chien	12	Series A. C.	39	6.6 amp.	4,000	75.00	600 ft.	25	Span wire	No	....	....	3.65	10.00	8.00	....	....
Waukesha	20	Enclosed arc	116	6.6 amp.	4,000	78.00	...	25	.....	No	....	Steam	2.975	13.50	8.10	10.00	3.00
WYOMING:																		
Laramie	...	Carbon Incand.	123	16 c. p.	4,000	10.80	1 block	15	Brackets	No	....	Steam	....	15.00	....	aa8.00	aa2.35
...	...	500 W. arc	21	350	4,000	10.80	R. R. yds.	25	Span wire	No	....	....	....	....	....	....	....
...	...	400 W. Mazda	11	...	4,000	10.80	...	25	Brackets	No	....	....	....	....	....	....	....

(a) 25% reduction if paid by the 10th of the month. (b) Per horse power year. (c) Dark till 1 A. M., and 5 A. M. till daylight. (d) In business section, 800 feet in residence section. (e) On business street; in residence section from 2 to 6 blocks apart. (f) Street lighting and commercial prices pending before public service commission. (g) For underground wires, iron poles are used. (h) Oil used, \$1.00 per barrel. (i) Per horse power. (j) For first 40, \$96 for the balance. (k) First 28 at this price, balance at \$66 (l) Plus \$1.50 per horse power flat. (m) Per thousand lamp hours. (n) 75 ft. in downtown district. (o) Till 1 A. M. (p) Until 11.30. (q) On bridges. (r) Fixed charge % cent per c. p. per month with 224 c. p. maximum charge, plus primary rate of 12 cents per k.w.h. for 32 hours use per month of installation plus secondary rate of 6 cts. per k.w.h. for excess; less 10% for prompt payment. (s) Oil used at 85 cts. a barrel. (t) Gas used at 10 cts. per thousand. (u) Oil used at 80 cts. a barrel (v) \$1.25 fixed charge per horse power connected load per month. (w) Gas at 28 cts. per thousand. (x) Gas at 22 cts. per thousand. (y) All above first 10, \$70 each. (z) Per k.w.h. (aa) Plus \$1.00 per horse power per month fixed charge.

(a) 25% reduction if paid by the 10th of the month. (b) Per horse power year. (c) Dark till 1 A. M. and 5 A. M. till daylight. (d) In business section, 800 feet in residence section. (e) On business street; in residence section from 2 to 6 blocks apart. (f) Street lighting and commercial prices pending before public service commission. (g) For underground wires, iron poles are used. (h) Oil used, \$1.00 per barrel. (i) Per horse power. (j) For first 40, \$96 for the balance. (k) First 28 at this price, balance at \$60. (l) Plus \$1.50 per month horse power flat. (m) Per thousand lamp hours. (n) 75 ft. in downtown district. (o) Till 1 A. M. (p) Until 11.30. (q) On bridges. (r) Fixed charge 4 cent per c. p. per month with 224 c. p. maximum charge, plus primary rate of 12 cents per k.w.h. for 32 hours use per month of installation plus secondary rate of 6 cts. per k.w.h. for excess; less 10% for prompt payment. (s) Oil used at 85 cts. a barrel. (t) Gas used at 10 cts. per thousand. (u) Oil used at 80 cts. a barrel. (v) \$1.25 fixed charge per horse power connected load per month. (w) Gas at 28 cts. per thousand. (x) Gas at 22 cts. per thousand. (y) All above first 10, \$70 each. (z) Per k.w.h. (aa) Plus \$1.00 per horse power per month fixed charge.

TABLE No. 2. DATA CONCERNING STREET ILLUMINATION. MUNICIPAL PLANTS.

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps in use.	Nominal c.p. or amperes.	Hours burned per year, amount.	Contract price, \$60.00.	Average distance between street lamps.	Height above street.	Method of supporting lamps.	Are wires in conduits?	Conduits under road or walks?	Current by water or steam?	Cost of coal per ton.		Prices for commercial light.		Prices for commercial power.	
															Max.	Min.	Max.	Min.
ALABAMA:													\$3.15	\$10.00	....	....	\$7.00	....
Dathan	6.5	Arcs	64	6.6 amp.	moonlight	\$60.00	350 ft.	25	Mast arms	No	....	Steam	....	....	....	....	....	....
ARKANSAS:																		
Bentonville	8	Series Mazda.	127	60 c. p.	2,000	free	300 ft.	20	Centre suspension & bracket	No	....	Steam	2.10	10.00	10.00	7.00	....	....
CALIFORNIA:																		
Pasadena	125	Arcs	284	....	....	60.00	1 block	14	Mast arms	No	....	Steam	80a	5.00	....	4.00	....	....
....	....	6.6 amp. Tungsten.	1,195	40 c. p.	....	12.00	1 block	17	Mast arms	....	....	....	....	....	....	....	....	....
....	....	6.6 amp. Tungsten.	18	60 c. p.	....	18.00	1 block	17	Mast arms	....	....	....	....	....	....	....	....	....
....	....	6.6 amp. Tungsten.	139	80 c. p.	....	24.00	1 block	17	Mast arms	....	....	....	....	....	....	....	....	....
....	....	6.6 amp. Tungsten.	53	250 c. p.	....	48.00	1 block	17	Mast arms	....	....	....	....	....	....	....	....	....
....	....	6.6 amp. Tungsten.	54	350 c. p.	....	5.00	1 block	17	Mast arms	....	....	....	....	....	....	....	....	....
....	....	25 W. Tungsten.	4	....	....	6.00	1 block	17	Mast arms	....	....	....	....	....	....	....	....	....
....	....	40 W. Tungsten.	54	....	....	12.00	1 block	17	Mast arms	....	....	....	....	....	....	....	....	....
....	....	60 W. Tungsten.	3	....	....	18.00	1 block	17	Mast arms	....	....	....	....	....	....	....	....	....
COLORADO:																		
Silverton	2.2	A. C. arcs	50	6.6 amp.	3,650	60.00e	300 ft.	22	Mast arms	No	....	Water	....	7.50	10.00	....	....	....
....	....	Tungsten	28	60 watts	3,650	....	....	..	....	....	....	....	....	....	....	....	....	....
CONNECTICUT:																		
Norwich	50	Series arcs	254	6.6 amp.	4,000	2.8b	....	..	Mast arms	No	....	Both	4.50	10.00	5.00	5.00	2.00	....
....	....	Series incand.	308	40 & 75 W.	4,000	2.8b	500 ft.	20	Mast arms	No	....	Steam & oil engine	3.50c	9.00	5.00	5.00	3.00	....
South Norwalk ..	17	Magnetite	2	5 amp.	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	Enclosed arc	116	5 amp.	4,000	54.00	500 ft.	14-20	Mast arms	....	....	....	....	....	....	....	....	....
....	....	50-70 W. Tungsten.	48	5 amp.	4,000	10.80	250 ft.	14	Brackets	....	....	....	....	....	....	....	....	....
....	....	Carbon incand.	20	60 watts	4,000	5.04	25 ft.	9	Under R.R. bridges	No	....	....	....	....	....	....	....	....
Wallingford	18	100 W. Tungsten.	161	80 c. p.	4,000	20.00	300 ft.	16	Bracket	No	....	....	4.13	10.00	....	....	3.00	....
....	....	250 W. Tungsten.	33	200 c. p.	4,000	40.00	300 ft.	16	Brackets & centre suspension	....	....	....	....	....	....	....	....	....
....	....	400 W. Tung. clus.	27	320 c. p.	4,000	83.00	300 ft.	16	Centre suspension	....	....	....	....	....	....	....	....	....
DELAWARE:																		
Dover	10	250 W. Mazda.	50	....	3,600	....	500 ft.	15	Cable	No	....	Steam	4.25	6.00	....	....	....	....
....	....	100 W. Mazda.	100	....	3,600	12.00	500 ft.	10	Bracket	No	....	Steam	4.20	10.00	....	....	....	....
Milford .....	....	60 W. Mazda.	130	....	3,600	....	....	....	Brackets	....	....	....	....	....	....	....	....	....
FLORIDA:																		
Ocala	8	Enclosed arc	50	6.6 amp.	3,650	90.00	2 blocks	14	Poles suspension	No	....	Steam	2.00d	8.00	....	7.00	5.00	....
....	....	100 W. Mazda.	120	6.6 amp.	3,650	24.00	1 block	14	Brackets	....	....	....	....	....	....	....	....	....
GEORGIA:																		
Cedartown	5	Arcs	35	485 watts	moonlight	60.00	400 ft.	20	Suspension	No	....	Steam	2.50	8.00	4.80	5.00	3.00	....
....	....	Series incand.	60	200 c. p.	moonlight	24.00	400 ft.	20	Sus. & bracket	No	....	Steam	3.10	12.00	10.00	9.00	5.00	....
Covington	12	Series incand.	60	350 c. p.	2,000	....	600 ft.	15	....	No	....	Steam	3.40	10.00	....	9.00	2.50	....
Dublin	15	Enclosed arc	20	400 c. p.	moonlight	....	800 ft.	25	....	No	....	Steam	....	....	....	....	....	....
....	....	Magnetite	62	6.6 amp.	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	Series Tungsten.	38	80 c. p.	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	Series Tungsten.	5	350 c. p.	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Moultrie	4	Series arcs	18	6.6 amp.	2,400	....	600 ft.	18-20	Suspension	No	....	Steam	3.30	10.00	....	....	....	....
....	....	Multiple arc	14	3 amp.	2,400	....	300 ft.	18-20	Suspension	....	....	....	....	....	....	....	....	....
....	....	Series incand.	10	200 c. p.	2,400	....	600 ft.	18-20	Suspension	....	....	....	30.00	16.50	11.00	....	....	....
....	....	....	36	6.6 amp.	2,000	....	400 ft.	15-20	Sus'p'n & bracket	none	....	....	....	....	....	....	....	....
Sandersville	2.5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
ILLINOIS:																		
Hinsdale	30	6.6 amp. Tungsten.	200	60 c. p.	....	....	400 ft.	18	Brackets	No	....	Steam	.90	13.50	....	7.50	....	....
Metropolis	30	6.6 amp. series.	15	32 c. p.	4,000	....	300 ft.	18-30	Span wire, brackets & mast arms	No	....	Steam	1.57	7.00	5.00	....	....	....
....	....	6.6 amp. series.	40	60 c. p.	4,000	....	300 ft.	18-30	Span wire, brackets & mast arms	No	....	....	....	....	....	....	....	....
....	....	6.6 amp. series.	100	100 c. p.	4,000	....	300 ft.	18-30	Span wire, brackets & mast arms	No	....	....	....	....	....	....	....	....
....	....	6.6 amp. series.	2	350 c. p.	....	....	300 ft.	18-30	Span wire, brackets & mast arms	No	....	....	....	....	....	....	....	....
St. Charles	14	Mazda	350	100 c. p.	4,000	35.00	300 ft.	25	Centre suspension	No	....	Steam	2.15	10.00	....	6.00	....	....
Shelbyville	20	Tungsten	100	80 c. p.	3,600	24.00	300 ft.	20	Iron hood	No	....	Steam	1.10	9.00	7.00	....	....	....
....	....	Tungsten	300	48 c. p.	3,600	18.00	300 ft.	20	Iron hood	No	....	....	....	....	....	....	....	....
....	....	D. C. arc.	625	6.6 amp.	4,000	45.-76.00e	400 ft.	25-30	Span wire	No	....	Steam	1.10	....	....	....	....	....

TABLE NO. 2. DATA CONCERNING STREET ILLUMINATION. MUNICIPAL PLANTS.

(Continued).

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps.	Nominal c. p. or amperes.	Hours burned per year, amount.	Contract	Average distance between lamps.	Height above street.	Method of supporting lamps.	Are wires in conduits?	Conduits under road or side-walks?	Current by water or steam?	Cost of coal per ton.		Prices for commercial power.	
													Max.	Min.	Max.	Min.
INDIANA:																
Auburn	14	Magnetite arc	40	6.6 amp.	2,800	60.00	1,000 ft.	22	Suspension	No	....	Steam	\$2.60	\$10.00	\$4.50	....
Decatur	200	Magnetite arc	80	4 amp.	4,000	52.00	480 ft.	25	Span wire	No	....	Steam	2.45	8.00	5.00	....
Fort Wayne	30	.....	600	4 amp.	4,000	53.00	500 ft.	25	Span wire	Both	....	Steam	1.90	8.00	3.00	....
Frankfort	....	.....	165	6.6 amp	3,050	50.00	560 ft.	20	Cable & mast arm	No	....	Steam	1.80	12.00	2.00	....
....	....	.....	35	4 amp.	3,650	....	....	....	.....	....	....	....	....	....	....	....
Marion	....	6.6 amp. enclos. arc	298	2,000 c. p.	3,056	....	330 ft.	25	Suspension	No	....	....	....	7.50	5.00	\$2.00
Mishawaka	25	Arc	165	6.6 amp.	300	....	....	....	Span wire & mast arm	No	....	Purchased	....	....	....	....
Washington	60	9.6 amp. Open arc.	154	2,000 c. p.	2,100	....	800 ft.	25	Centre suspension	No	....	Steam	1.40	10.00	3.00	....
Series Mazda	....	.....	24	200 c. p.	2,400	....	600 ft.	20	Bracket	No	....	....	....	....	....	....
IOWA:																
Ames	25	6.6. am. Ser. Mazda	125	32 c. p.	3,000	16.80	300 ft.	15	Centre suspension & brackets	No	....	Steam	2.59	....	....	....
....	....	6.6 am. Ser. Mazda	10	200 c. p.	3,000	33.00	300 ft.	15	Brackets	No	....	....	....	....	....	....
Chariton	12	Gem	142	100 watts	moonlight	....	1 block	16	Centre suspension	No	....	Steam	1.55	13.00	8.00	6.00
....	....	Mazda	50	50 watts	....	....	1 block	16	Centre suspension	No	....	....	....	....	....	....
Fairfield	20	Tungsten	206	80 c. p.	2,000	3 cts. g	500 ft.	12	Brackets	No	....	....	....	....	....	....
....	....	Arc	4	400 c. p.	2,000	3 cts. g	400 ft.	15	Masts	No	....	....	....	....	....	....
....	....	.....	....	....	....	....	....	....	Brackets & center suspension	No	....	....	....	....	....	....
Webster City	26	Mazda	268	48 c. p.	....	....	300 ft.	18	Brackets & center suspension	No	....	Steam	1.78	10.00	8.00	4.00
....	....	Mazda	11	500 c. p.	....	....	350 ft.	25	Brackets & center suspension	No	....	....	....	....	....	....
KANSAS:																
Augusta	5	Natural gas	150	80 c. p.	8,760	14.00	300 ft.	7	Posts	No	....	Natural gas	....	10.00	6.00	....
Baldwin City	3	Incandescent	60	100 watts	2,200	24.00	350 ft.	25	Brackets	No	....	Steam	1.85	10.00	6.00	....
Girard	9	Mazda series	118	60 c. p.	3,000	24.00	400 ft.	18	Brackets	No	....	Steam & gas	3.031	10.00	4.00	2.50
Ottawa	24	75 W. Mazda	175	60 c. p.	2,800	1.00h	500 ft.	15-20	Brackets	No	....	....	....	....	....	....
....	....	Enclosed series arc	26	6.6 amp.	2,800	78.00h	500 ft.	15-20	Mast arms	No	....	....	....	....	....	....
Sterling	8	40 W. series	60	32 c. p. }	moonlight	15.00	380 ft.	20	Span wire	No	....	Oil engine	....	....	....	....
....	....	80 W. series	30	60 c. p. }	all night	18.00	80 ft.	18	Bracket	No	....	....	....	....	....	....
Topeka	....	Metallic arc	450	4 amp.	2,900k	34-63.00	500 ft.	16	Mast arms & suspension	No	....	Steam	2.15	10.00	3.00	....
Winfield	....	100 W. Tungsten	67	6.6 amp.	1,800	48.00	800 ft.	30	Suspension	No	....	Steam	2.25	10.00	5.00	3.00
....	....	Arc	113	6.6 amp.	....	....	....	....	....	....	....	....	....	....	....	....
KENTUCKY:																
Nicholsville	6	Carbon arc	62	6.6 amp.	2,200	47.00	400 ft.	30	Span wire	No	....	Steam	2.00	7.50	....	....
Paducah	....	Magnetite	245	4 amp.	3,500	....	1 1/2 blocks	25	Span wire	No	....	Steam	1.78	....	....	....
LOUISIANA:																
Donaldsonville	5	Mazda	200	60 c. p.	3,000	....	150 ft.	20	Suspension	No	....	Steam	3.75	20.00	12.00	10.00
Houma	7	Arc	21	6.6 amp.	3,500	....	300 ft.	22	Mast arms	No	....	Steam	3.60	15.00	....	....
....	....	6.6 amp. Incand.	128	60 c. p.	3,500	....	300 ft.	18	Goose-necks	No	....	....	....	....	....	....
New Iberia	6	Arc	45	6.6 amp.	2,900	....	300 ft.	18	Span wire	No	....	Steam	3.50	10.00	8.00	....
....	....	100 W. arc	100	6.6 amp.	2,900	....	300 ft.	18	Brackets	....	....	....	....	....	....	....
MASSACHUSETTS:																
Hingham	175	50 W. Series Tung.	549	6.6 amp.	2,280	4.1g	300 ft.	16	Brackets	No	....	Steam	....	10.00	....	5.50
....	....	350 W. Tungsten	473	6.6 amp.	2,280	4.1g	....	18-20	Mast arms	No	....	Both	....	....	....	....
Holyoke	....	Arc	371	6.6 amp.	3,974	45.00	....	....	....	No	....	....	4.43	6.00	5.00	1.30
....	....	Gem	22	6.5 amp.	3,974	....	....	....	....	....	....	....	....	....	....	....
....	....	Tungsten	199	6.6 amp.	3,974	11.28	....	....	....	....	....	....	....	....	....	....
North Attleboro.	40	Tungsten	850	40 c. p.	2,200	....	....	18	Brackets	No	....	Steam	4.25	13.50	10.00	2.00
Wakefield	60	Arc	312	800 c. p.	1,845	....	500 ft.	22	Mast arms	No	....	Steam	4.65	18.00	10.00	3.00
....	....	Incandescent	430	40 c. p.	1,845	....	....	....	....	No	....	....	....	....	....	....
....	....	Incandescent	10	100 c. p.	1,845	....	200 ft.	22	Goose-necks	No	....	....	....	....	....	....
....	....	Incandescent	8	200 c. p.	1,845	....	100 ft.	22	Goose-necks	No	....	....	....	....	....	....
....	....	Incandescent	24	500 c. p.	1,845	....	300 ft.	30	Goose-necks	No	....	....	....	....	....	....
MICHIGAN:																
Alpena	....	Metallic flame	131	6.6 amp.	3,000	55.75n	2 blocks	18	Mast arms	No	....	Steam	2.10	....	....	....
Grand Rapids	200	Enclosed D. C.	838	6.6 amp.	4,000	60.00	1,000 ft.	35	Cable	No	....	Steam	2.43	....	....	....
....	....	Enclosed A. C.	50	6.6 amp.	4,000	58.54o	1,000 ft.	20	Mast arms	No	....	Steam	2.43	....	....	....
....	....	Magnetite	112	6.6 amp.	4,000	58.54o	500 ft.	20	Iron poles	Yes	....	....	....	....	....	....
Holland	33.5	Enclosed A. C.	185	6.6 amp.	3,000	50.00p	1 block	18	Span wire & mast arm	No	....	....	....	....	....	....
....
Ithaca	4	Series Tungsten	24	6.6 amp.	1,825	....	800 ft.	25	Span wire	No	....	Steam	2.90	8.30	5.00	2.00
....
Marshall	....	Series Tungsten	60	40 watts	....	....	....	....	....	No	....	....	....	....	....	....
....	....	Series A. C.	108	6.6 amp.	....	35.00	400 ft.	20	Span wires	No	....	Water	....	5.00	4.00	....
....	....	100 W. Series Tung.	18	6.6 amp.	....	10.00	....	....	Brackets	....	....	....	....	....	....	....

TABLE NO. 2. DATA CONCERNING STREET ILLUMINATION. MUNICIPAL PLANTS. (Continued).

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps in use.	Nominal c. p. or amperes.	Hours burned per year.	Contract amount.	Average distance between lamps.	Height above street.	Method of supporting wires.	Are wires in conduits?	Conduits under road or side-walks?	Current by water or steam?	Cost of coal per ton.		Prices for commercial power.	
													Max.	Min.	Max.	Min.
MICHIGAN (Continued)																
St. Clair	...	Arc	36	7.5 amp.	...	\$50.00h	360 ft.	20-25	Span wires & mast arms	No	...	Steam	\$3.00	\$10.00	\$8.00	\$4.00
	...	Series Mazda	12	7.5 amp.	...	50.00h	360 ft.	20-25	Span wires & mast arms	No	...	...	...	...	...	...
	...	100 W. Mazda	25	...	...	nothing	...	..	Brackets	...	...	...	...	...	...	...
MINNESOTA:																
Fairmont	...	60 W. Mazda	85	50 c. p.	4,015	1.50	300 ft.	12	Goosenecks	No	...	Producer gas	6.05	12.00	8.00	4.00
Hibbing	7	Arc	12	1,200 c. p.	4,015	72.00	300 ft.	22	Centre suspension	...	...	...	...	...	...	...
Lake City	3	Luminous arc	53	6.6 amp.	...	120.00	300 ft.	30	Centre suspension	No	...	Steam	2.80	7.00	...	...
	...	...	34	1,200 c. p.	1,440	60.00	600 ft.	30	Centre suspension	No	...	Steam	3.65	10.00	8.00	...
	...	...	37	1,000 c. p.	1,440	60.00	600 ft.	30	Cross arm	...	...	...	...	...	...	...
	...	...	8	350 c. p.	1,800	60.00	300 ft.	30	Cross arm	...	...	...	...	...	...	...
Shakopee	4	Series Mazda	60	100 c. p.	to 11.30	...	1 1/2 blocks	16	Brackets	No	...	Steam	3.70	10.00	6.00	...
Thief River Falls	5	Enclosed arc	22	6 amp.	4,000	3 cts. q	500 ft.	25-30	Centre suspension	No	...	Water & oil engines	5.70	9.00	6.00	2.50
MISSISSIPPI:																
Canton	...	Series Tungsten	135	6.6 amp.	moonlight	10 cts. q	270 ft.	22	Centre suspension & brackets	No	...	Steam	3.00	10.00	8.00	...
Grenada	10	...	30	6.6 amp.	...	...	400 ft.	20	Span wires	No	...	Steam	2.70	12.50	8.00	...
Port Gibson	10	Enclosed arc	25	400 amp.	moonlight	60.00	600 ft.	20	Brackets	No	...	...	...	...	...	...
Yazoo City	6	Series Mazda	72	80 c. p.	moonlight	96.00	600 ft.	20	Centre suspension	No	...	...	...	...	...	...
	...	6.6 amp. Ser. encl. arc	11	500 c. p.	2,920	42.00	350 ft.	20	Pole brackets	No	...	Steam	2.68	16.00	9.00	4.00
	...	Series incand.	...	350 c. p.	2,920	42.00	350 ft.	15	Brackets	No	...	...	...	...	...	...
MISSOURI:																
Albany	8	Carbon	50	16 c. p.	2,930	...	300 ft.	20	Bracket	No	...	Steam	2.60	10.00	...	...
	...	100 W. Mazda	38	80 c. p.	1,460	...	300 ft.	20	Bracket	No	...	...	...	...	...	...
	...	Arcs	8	500 c. p.	1,460	...	600 ft.	25	Suspension	No	...	...	...	...	...	...
Bethany	...	Tungsten	165	80 c. p.	2,000	1.50	...	14	Brackets	No	...	Steam	2.35	10.00	5.00	...
Columbia	...	6.9 amp. Ser. Tung.	200	60 c. p.	2,000	free	...	25	Centre suspension	No	...	Steam	2.25	12.00	7.50	4.00
	...	Enclosed arc	50	250 c. p.	2,000	free	...	25	Centre suspension	No	...	Steam	2.60	12.00	6.00	3.00
Fulton	30	Series Tungsten	140	6.4 amp.	2,000	free	...	30	Centre suspension	No	...	Steam	2.60	12.00	7.50	4.00
	...	Tungsten	220	32 c. p.	moonlight	12.00	1 block	20	Brackets	No	...	...	...	...	...	...
Kirkwood	...	Series Tungsten	150	60 c. p.	all night	free	350 ft.	14	Bracket & suspen.	No	...	Steam	2.10	...	...	...
Lebanon	5	Tungsten	20	60 c. p.	all night	free	...	...	Brackets	No	...	Steam	3.00	12.00	...	...
Pierce City	6	Series Tungsten	150	4 amp.	...	...	...	...	Brackets	No	...	Steam	1.25	...	...	...
	...	Arc	256	2,000 c. p.	all night	free	...	..	...	...	...	...	...	...	...	...
	...	Incandescent	...	16 c. p.	...	...	...	..	...	...	...	...	...	...	...	...
NEBRASKA:																
Crete	...	...	27	6.3 amp.	...	...	...	40	Mast arm and centre suspension	No	...	Steam	3.90	10.00	6.00	3.50
Hastings	...	40 W. Mazda	200	32 c. p.	2,500	free	100 ft.	15	Brackets	No	...	Steam	3.50	...	...	...
	...	6.6 amp. Mazda	30	200 c. p.	2,500	...	600 ft.	25	Centre suspension	No	...	...	...	...	...	...
	...	Series arc	50	6.6 amp.	2,500	...	600 ft.	25	Centre suspension	No	...	...	...	...	...	...
Schuyler	11	Tantalum	130	20 c. p.	1,800	4.00e	350 ft.	16	Goosenecks	No	...	Steam	4.30	12.00	8.00	...
NEW JERSEY:																
Orange	88	Luminous arc	375	4 amp.	4,000	56.00p	500 ft.	18	Mast arms	No	...	Steam	3.65	...	...	...
	...	Series Tungsten	165	60 c. p.	4,000	14.00p	250 ft.	12	Goosenecks	No	...	...	...	...	...	...
Vineland	6.5	Metallic flame	100	4 amp.	3,000	...	333 ft.	22	Span wire	No	...	Steam	1.20	12.00	8.00	4.00
NEW YORK:																
Camden	7	Series arc	74	2,000 c. p.	3,650	50.00	600 ft.	20	Mast arms	No	...	Oil engine	4.08	8.00	2.50	1.50
Dunkirk	34	Enclosed arc	300	7.5 amp.	3,782	46.00p	750 ft.	21	Suspension	No	...	Steam	2.50	7.00	6.00	...
Fairport	8	Incandescent	74	7.5 amp.	all night	58.00h	750 ft.	18	Span wire	No	...	Both	2.80	8.00	...	...
Green Island	17	Arc	61	6.6 amp.	all night	70.00	350 ft.	35	Mast arms	No	...	Both	3.00	10.00	6.00	6.00
Owego	...	Incandescent	69	5.5 amp.	all night	68.00	400 ft.	20	Mast arms	...	...	...	...	...	...	...
	...	Incandescent	33	100 c. p.	all night	1.50	120 ft.	20	Mast arms	...	...	...	...	...	...	...
	...	Bivd. Welsbachs	160	60 watts	all night	9.60	120 ft.	16	Mast arms	No	...	Water	...	...	...	...
Potsdam	20	Series Tungsten	104	60 c. p.	3,800	...	500 ft.	16	Mast arms	No	...	...	...	...	...	...
Solvay	10	...	190	...	4,000	...	150 ft.	14	Bracket	No	...	...	...	...	8.00	1.75
NORTH CAROLINA:																
Rocky Mount	12	Series Tungsten	68	6.6 amp.	...	12.00	...	14	Bracket	No	...	Steam	3.50	10.00	...	...
	...	Arc	72	6.6 amp.	all night	50.00	1 block	14	Bracket	No	...	Water	...	10.00	6.00	1.35
Statesville	25	Series Mazda	50	6.6 amp.	all night	1.5 cts. t	100 ft.	16	Span wire	No	...	...	...	...	...	...
	...	...	...	...	...	...	...	...	Brackets	No	...	...	...	...	...	...
OHIO:																
Bryan	9	Series enclosed	75	7 amp.	3,000	27.00	1,000 ft.	25	Span wire	No	...	Oil engine	2.38c	6.00	...	2.00

TABLE NO. 2. DATA CONCERNING STREET ILLUMINATION. MUNICIPAL PLANTS. (Continued).

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps in use.	Nominal c. p. or amperes.	Hours burned per year.	Contract amount.	Average distance between lamps.	Height above street.	Method of supporting lamps.	Are wires in conduits?	Conduits under road or side-walks?	Current by water or steam?	Cost of coal per ton.		Prices for commercial light.		Prices for commercial power.	
													Max.	Min.	Max.	Min.	Max.	Min.
OHIO (Continued)																		
Cleveland	737	Gas	5,422	60 c. p.	3,760	\$8.00	150 ft.	12	Boulevard post	...	...	...	...	...	...	...	...
		Gasoline	780	60 c. p.	3,760	51.96	150 ft.	12	Boulevard post	...	...	...	...	...	...	...	...
		Enclosed arc	1,258	1,200 c. p.	3,760	51.96	400 ft.	25	Pole	No	...	...	...	...	...	...	...
		Magnetite	...	1,500 c. p.	3,760	51.96	400 ft.	25	Pole	No	...	...	...	...	...	...	...
		Flaming arc	...	2,000 c. p.	3,760	51.96	400 ft.	25	Pole	No	...	...	...	...	...	...	...
Conneaut	16	100 W. Mazda	135	80 c. p.	3,600	16.00	1 block	22	Bracket and span wire	No	...	...	...	...	...	...	...
		250 W. Mazda	50	200 c. p.	3,600	40.00	...	22	Bracket and span wire	No	...	...	...	...	...	...	...
Gallon	...	Arce	10	2,000 c. p.	3,600	50.00	400 ft.	30	Span wire	No	...	...	...	...	...	...	...
Greenfield	...	Enclosed arc	137	6.8 amp.	3,000	55.00	400 ft.	...	Suspension	No	...	...	...	...	...	...	...
	115	A. C. arc	365	7.5 amp.	4,000	...	400 ft.	28	Span wire & mast	No	...	...	...	...	...	...	...
	...	75 W. Series Mazda	400	...	...	...	300 ft.	28	Span wire & brackets	...	...	...	...	...	...	...	...
Marietta	40	Open arc	218	6.6 amp.	2,986	38.98p	400 ft.	22	Bracket & cable	No	...	...	...	...	...	...	...
Miamisburg	40	Mazda Tungsten	99	100 c. p.	2,190	10.00	400 ft.	22	Brackets & cable	No	...	...	...	...	...	...	...
Napoleon	15	Series A. C.	300	6.6 amp.	2,000	free	500 ft.	18	Centre suspension	No	...	...	...	...	...	...	...
Wapakoneta	30	Open arc	94	9.6 amp.	moonlight	free	1 block	30	Centre suspension	No	...	...	...	...	...	...	...
Waverly	7	Series Incand.	45	200 c. p.	2,000	...	400 ft.	20	Centre suspension	No	...	...	...	...	...	...	...
OKLAHOMA:																		
Durant	15	Luminous arc	40	4 amp.	4,425	...	750 ft.	25	Mast arm	No	...	...	...	...	...	...	...
PENNSYLVANIA:																		
Chambersburg	30	Series arc	141	6.6 amp.	4,000	75.00	300 ft.	25	Span wire	No	...	...	...	...	...	...	...
	...	Mult. Incand.	851	32 amp.	4,000	18.00	...	16	Span wire & goose-neck	No	...	...	...	...	...	...	...
Corasopolis	...	A. C. enclosed arc.	55	6.6 amp.	3,650	70.00	...	18	Mast arms	No	...	...	...	...	...	...	...
	...	Metallic flame	50	4 amp.	3,650	70.00	...	18	Mast arms	No	...	...	...	...	...	...	...
Ephrata	...	Series arc	38	7.5 amp.	all night	53.00	300 ft.	20	Span wire	No	...	...	...	...	...	...	...
	...	Series Incand.	9	100 c. p.	all night	free	...	25	Mast arms	No	...	...	...	...	...	...	...
Millvale	8.5	Flaming arc	98	4 amp.	4,745	...	250 ft.	25	Mast arms	No	...	...	...	...	...	...	...
Morristown	13	Magnetite	231	4 amp.	4,000	39.00p	600 ft.	25	Mast arm & span wire	No	...	...	...	...	...	...	...
	...	Series Tungsten	120	75 c. p.	4,000	8.45p	...	20	Poles	No	...	...	...	...	...	...	...
Pitcairn	5	A. C. Series arc.	53	6.6 amp.	5,466	50.00	700 ft.	20	Span wire	No	...	...	...	...	...	...	...
St. Clair	...	D. C. Series arc.	26	10 amp.	4,000	60.00	700 ft.	20	Span wire	No	...	...	...	...	...	...	...
	...	Series Mazda	10	200 c. p.	4,000	48.00	350 ft.	15	Span wire	No	...	...	...	...	...	...	...
	...	Series Mazda	47	32 c. p.	4,000	36.00	1 block	25	Bracket	No	...	...	...	...	...	...	...
Tarentum	14	Magnetite	108	4 amp.	all night	72.00	1 block	25	Span wire & mast arm	No	...	...	...	...	...	...	...
Titusville	40	9.6 amp. ser. open arc.	154	2,000 c. p.	all night	...	300 ft.	22	Span wire & mast arm	No	...	...	...	...	...	...	...
SOUTH CAROLINA:																		
Orangeburg	11	Carbon arc	78	6.6 amp.	3,500	...	...	22	...	No	...	...	...	...	...	...	...
	...	Mazda	35	6.6 amp.	3,500	...	...	...	...	...	...	...	...	...	...	...	...
TENNESSEE:																		
Jackson	...	Magnetite	160	4 amp.	...	...	...	...	...	...	...	...	...	...	...	...	...
TEXAS:																		
Austin	...	Series arc	200	7.5 amp.	3,650	...	1,250 ft.	150	On steel towers, 6 lamps to a tower	No	...	...	...	...	...	...	...
	...	Mazda	186	100 c. p.	3,000	65.00w	200 ft.	25	Poles	No	...	...	...	...	...	...	...
Denton	100	Luminous arc	375	4 amp.	...	18.00	350 ft.	25	Span wire	No	...	...	...	...	...	...	...
Huntsville	...	40 W. Gem.	46	16 c. p.	...	...	160 ft.	15	Centre suspension & goosenecks	No	...	...	...	...	...	...	...
UTAH:																		
Ephraim City	10	Arc	16	6 amp.	800	...	600 ft.	16	Mast arms	No	...	...	...	...	...	...	...
	...	Tungsten	200	40 watts	5,840	...	300 ft.	16	Bracket	No	...	...	...	...	...	...	...
Logan City	...	6.6 amp. Ser. Tung.	200	80 c. p.	4,380	...	300 ft.	20	Bracket	No	...	...	...	...	...	...	...
Payson	...	4 amp. Series Tung.	82	100 c. p.	...	...	...	20	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts	8,760	...	...	...	...	...	...	...	...	...	...	...	...
	...	4 amp. Series Tung.	30	60 watts														

TABLE NO. 2. DATA CONCERNING STREET ILLUMINATION. MUNICIPAL PLANTS. (Continued).

City.	Miles of streets lighted.	Kind of lamp.	Number of lamps in use.	Nominal c. p. or amperes.	Hours burned per year, amount.	Contract amount.	Average distance between lamps.	Height above street.	Method of supporting lamps.	Are wires in conduits?	Conduits under road or side-walks?	Current by water or steam?	Cost of coal ton.	Prices for commercial light.	Prices for commercial power.
														Max.	Min.
VERMONT:															
Burlington	30	Arc 6.6 amp. series.....	270	6.6 amp.	4,000	\$18.00	400 ft.	12-16	Mast arms	No	....	Steam	\$4.00	10.00	\$5.00
WISCONSIN:															
Algoma	5	Enclosed arc	31	6.6 amp.	....	85.00	2 blocks	25	Suspension	No	....	Steam	3.80	11.00	....
Jefferson	...	Incandescent	4	75 c. p.	2,500	28.20	...	12	Hoods	No	....	Both	....	....	....
Kaukauna	20	Mazda	115	60 c. p.	4,000	18.00	1 block	20-25	Span wire	No	....	Both	4.40	16.00	10.00
	...	Enclosed arc	53	6.6 amp.	4,000	65.00	1 1/2 blocks	23	Centre suspension	No	....	....	3.70	12.00	8.00
	...	Mazda	21	6.6 amp.	4,000	42.00	1 1/2 blocks	23	Centre suspension	No	....	....	....	....	....
ALBERTA, CANADA:															
Calgary	50	Magnetite&plain arc	1,053	500-1,000 c. p.	4,000	70.00	250 ft.	30-40	Brackets	No	....	Both	....	7.50	4.00
Edmonton	71.5	A. C. Series encl...	305	6.6 amp.	3,700	81.00	340 ft.	25	Mast arms	No	....	Steam	3.40	8.00	3.50
	...	Metallic flame	300	6.6 amp.	3,700	81.00	340 ft.	25	St. R., centre poles	...	....	....	....	....	....
	...	125 W.	25	250 watts	3,700	45.00	100 ft.	13	Brackets	No	....	Steam	1.80	9.00	7.00
Lethbridge	27	A. C. arcs	160	100 c. p.	4,000	12.00	100 ft.	18	Mast arms	No	....	....	....	....	2.00
	...	Metallic flame	55	6.6 amp.	4,000	65.00	120 ft.	25	Mast arms	...	....	....	....	....	....
ONTARIO, CAN.															
Barrie	...	Arc	53	6.6 amp.	1,200	45.00	1 block	20	Bracket	No	....	Steam	4.33	9.00	2.00

(a) Per barrel of crude oil. (b) Per K.W.H. average cost of arcs \$61.00; including current, carbons, repairs and maintenance. Incandescent averaged \$11.07, including renews. (c) Fuel oil 4.5 cts. per gallon. (d) Per cord of wood. (e) Interest and depreciation not included. (f) Per K.W.H. current bought from private plant. (g) Per K.W.H. H. bought from private company. (h) Rate paid department by city. (i) Gas engine used for street lighting, natural gas at 25 cts. per thousand feet. (j) Oil at 3 cts. per gallon. (k) If 4 1/2% interest and 5% depreciation be added, the cost would be \$47.72. (l) Includes 10% depreciation and 5% interest. (m) On main street 220 feet apart on each side; other streets average 300 feet. (n) Includes \$16.16 interest and \$10.08 depreciation. (o) Includes \$2.25 loss through non-taxation, \$5.39 interest on bonds and \$5.86 interest on investment over bonded debt. (p) Includes taxes, depreciation and interest on bonded indebtedness. (q) Per K.W.H., cost including interest and up-keep of lamps. (r) Moonlight schedule to midnight. (s) 32 clusters of 5 each. (t) Per K.W.H. (u) Per thousand and cubic feet. (v) On principal streets greater distance on outlying sections. (w) Current proposed at 2.5 per K.W.H., cost does not include interest or depreciation. (x) 26 all night, 20 on moonlight schedule. (y) Plus \$1.50 per horse power month.

In cities where the plant is municipally operated, the installation was paid for by the city in 13 cases, by property owners in 14, by subscription by the merchants in 1, and in one the city paid one-half. Maintenance is paid for by the merchants in one case only, the cost in all other cases coming either from the tax levy or the profits of the lighting department.

In some cases the lighting company furnishes the standard, but under a contract for a certain payment per month which recompenses it to a greater or less extent. One charges \$6 per month for each standard carrying four 100-watt tungstens. Another receives \$2.25 per month for each 25 feet, the standards being 85 feet apart and each carrying one 100-watt and four 60-watt mazdas. In another city each business house pays \$1.50 per month for a 40-watt mazda in front of his store. The only city which charges for this lighting receives \$1 per lineal foot for 5-light mazda posts spaced at 50 to 60 ft.

In a number of cities, generally those having five-light standards, one of the lights on each standard burns all night, the others are extinguished at 10.30, 11 or later in the evening.

Lamps for Display Lighting.

The term "ornamental lighting" has been used in most of the articles appearing in this issue to describe all lighting the purpose of which was anything other than the ordinary illuminating of streets; but it seems to us that in some cases the term "ornamental" is hardly appropriate, since the aim appeared not so much to ornament as to attract attention by dazzling brilliancy. Such would be the use of flame arcs, which to our mind are not strictly ornamental but may be considered as display advertising pure and simple. The term "White Way" lighting has become a common one for describing all brilliant lighting, whether ornamental or not; but the expression is rather awkward for use in serious descriptions, and we would suggest that the word "display" be substituted for it.

Of the 72 cities whose display lighting is included in tables 3 and 4 in this issue, 37 report using tungsten lamps, 28 mazda, 4 flame arcs, 2 "arcs," 1 arc, 2 incandescent, 1 gem, 1 magnetite, and 4 not named.

Because of its present popularity, we are presenting in another column an article descriptive of mazda lamps, their advantages and uses. It is to be understood that this is not an article on lamps generally, that there is no comparison made in it between mazda and other lamps, and it is written by an engineer who is apparently prejudiced in favor of these lamps. He is, however, thoroughly familiar with the subject and the figures and other technical data presented can be relied upon.

Spacing of Display Lighting Standards.

As is generally known, there should be a definite relation between the intensity of a light and the distance between standards, since the illumination near the standards depends upon the combination of both. There is some interest in knowing the spacing adopted in different cities for display lighting standards. From the tables in this issue we obtained the following figures:

In one city the space is 380 feet, 300 feet in one, 200 in two, 175 in one, 160 in two, 150 in two, 125 in three, 120 in two, 110 in two, 105 in one, 100 in nine, 95 in one, 90 in four, 85 in four, 80 in seven, 75 in eight, 80 in one, 65 in two, 60 in five, 55 in two, 50 in four, 42 in one and 25 in three.

The average spacing is 92 ft. in all the cities where the lighting is furnished by private plants, 101 ft., where it is furnished by municipal plants, or 97 ft., as the average of all.

TABLE NO. 3—DATA CONCERNING "WHITE WAY" LIGHTING—PRIVATE PLANTS.

City	Kind of Lamp	No. of lamps used	No. of stand-ards used	Distance between stand-ards	Cost of			Conducted under road or sidewalk	Payment made for	
					Complete installa-tion per front ft.	Operation and maint. per lamp	Are wires in conduits?		installa-tion by	mainte-nance by
						Current or gas	Other items		Owner	Owner
ARKANSAS	100 W. Tungsten	800	200	25	\$14.00	....	....	....	Owner	Owner
Little Rock	100 W. Tungsten	1,200	270	50-100	....	....	....	....	Owner	City
COLORADO	100 W. Tungsten	110	22	60	....	....	....	....	Consumer	Consumer
Colorado Springs	100 W. Tungsten	1,700	85a	1/4 block	....	....	....	....	City	City
CONNECTICUT	100 W. Tungsten	14	14b	85	\$0.30	\$0.10	\$0.80	....	....	Consumer
Hartford	60 W. Mazda	56	12	70	65.00	....	18.25c	....	....	....
Boise	100 W. Tungsten	12	12	84	29.50	....	2.10d	....	....	....
ILLINOIS	100 W. Mazda	90	90b	84	29.50	....	2.10d	....	....	....
Carro	60 W. Mazda	105	105b	65	45.00	....	70.00c	....	....	....
Urbana	100 W. Tungsten	730	146	42	40.00	....	.03	....	....	....
INDIANA	100 W. Tungsten	123	28	100	36.00	....	.06	....	....	....
Kokomo	100 W. Tungsten	400	80	85	55.00	....	69.50c	....	....	....
IOWA	100 W. Mazda	66	22	80	28.00	....	....	....	....	....
Cedar Rapids	100 W. Tungsten	55	55	....	....	....	....	....	....	....
Davenport	40, 60 & 100 W. Tungsten	3,000	3,000	50	....	....	....	....	....	....
Eagle Grove	40 W. Tungsten	23	23d	80	35.00	....	100.00h	....	....	....
Mason City	100 W. Tungsten	420	351	200	25.00	....	72.00c	....	....	....
KANSAS	100 W. Tungsten	455	51	85	....	....	....	....	....	....
Council Grove	Mazda Mult.	66	22	80	28.00	....	....	....	....	....
Washington	40 W. Mazda Mult.	55	55	....	....	....	....	....	....	....
COLORADO	Series Tungsten	3,000	3,000	50	....	....	....	....	....	....
Denver	Series Tungsten	23	23d	80	35.00	....	100.00h	....	....	....
MICHIGAN	100 W. Mazda	420	351	200	25.00	....	72.00c	....	....	....
Ishpeming	40 W. Tungsten	455	51	85	....	....	....	....	....	....
Manistique	100 W. Mazda	123	41	75	35.00	....	....	....	....	....
MINNESOTA	Mazda	156	52	75	35.00	....	....	....	....	....
Eveleth	Tungsten	30	30	75	....	....	....	....	....	....
MISSOURI	250 W. Tungsten	363	121	60	....	....	11.02c	....	....	....
Boonville	Series Incandescent	15	15	200	85.00	....	55.00	....	....	....
Brookfield	Magnetite	57	57	105k	2.65	....	60.00c	....	....	....
Lexington	Lum. Mag. Arc.	75	75	90	40.00	....	85.00c	....	....	....
NEW YORK	Inverted Lum. Arc.	473	431	110	....	....	85.00m	....	....	....
Utica	60 c. p. Tungsten	30	30	150	20.00	....	24.00c	....	....	....
NORTH CAROLINA	Met. Flame Arc.	272	17n	150	45.00	....	....	....	....	....
Wilmington	20 W. Tungsten	150	50	100	35.00	....	....	....	....	....
OHIO	Tungsten	15	15	100	....	....	84.00c	....	....	....
Elyria	4 Amp. Luminous	200	....	....	80.00	....	31.200	....	....	....
Van Wert	60 W. Mazda	135	....	....	....	....	23.00c	....	....	....
OKLAHOMA	100 W. Tungsten	33	....	....	....	....	43.00c	....	....	....
End	250 W. Tungsten	4	....	....	....	....	38.00c	....	....	....
OREGON	60 W. Mazda	15	15	100	....	....	58.00c	....	....	....
Astoria	60 W. Mazda	551	55q	100	115.00	....	3.00c	....	....	....
Pendleton	75 W. 66 Amp. and Series	4	4	....	30.00	....	.75	....	....	....
PENNSYLVANIA	60 W. Tungsten	60	60	4 per block	....	....	.88	....	....	....
Pittsburgh	40 W. Tungsten	240	240	4 per block	....	....	28.92	....	....	....
TEXAS	60 W. Tungsten	15	15	100	....	....	....	....	....	....
Gonzales	60 W. Tungsten	551	55q	100	115.00	....	.75	....	....	....
VIRGINIA	75 W. 66 Amp. and Series	4	4	....	30.00	....	....	....	....	....
Norfolk	60 W. Tungsten	60	60	4 per block	....	....	.88	....	....	....
WISCONSIN	40 W. Tungsten	240	240	4 per block	....	....	28.92	....	....	....
Monroe	60 W. Tungsten	15	15	100	....	....	....	....	....	....
WYOMING	60 W. Tungsten	551	55q	100	115.00	....	.75	....	....	....
Laramie	75 W. 66 Amp. and Series	4	4	....	30.00	....	....	....	....	....

(a) Suspended across street, 20 ft. in a string. (b) 100 W. and 4 60 W. to each standard. (c) Total charge per year. (d) Total cost per standard with 100 W. burning all night, 60 W. till 11 o'clock; if 100 W. burns till 11 o'clock only, deduct 47 cts. (e) Steel led. (f) Installed by public subscription. (g) Lamps are on cable in front of each store door, over curb, operated by time switch. (h) Total cost per post of 5 lights. (i) Arches, 12 lamps to each arch. (j) Installment by business men's association. (k) Staggered, 210 feet on each side of street. (l) Arches, 11 lamps to each arch. (m) Total per arch per year. (n) Arches, 16 lamps to arch. (o) Per post of 3 lamps per year. (p) In park. (q) In arches.

NOTE.—In several cases "Cost of Current Gas" is given per k. w. h. instead of per lamp. The smallness of the figure indicates which cases these are.

TABLE NO. 4—DATA CONCERNING "WHITE WAY" LIGHTING—MUNICIPAL PLANTS

City	Kind of Lamp	No. of lamps used	No. of stand-ards used	Distance between stand-ards	Stand-alone	Cost of		Are wires in conduits?	Conducted under road or Sidewalk	Payment made for	
						Complete installation per front ft.	Operation and maint. per lamp			installa-tion by Owner	mainte-nance by City
ALABAMA											
Dothan	60 W. Tungsten	2,690	130	100	\$37.00	\$0.55	Current \$1.80 or gas \$0.48	No		Owner	City
CALIFORNIA											
Pasadena	40 c. p. Tungsten	60	60	125	& 40.00		.03	No		Owner	City
CONNECTION											
Norwich	6.6 Amp. Flame Arcs	150	50	80	25.00	.90		Yes	Roadway	Owner	City
GEORGIA											
Cedartown	104 V. Mazda	180	60	160	25.06	.50	15.00b	No		c	City
ILLINOIS											
St. Charles	60 W. Mazda	76	76	30	30.00	.50	24.00	Yes	Both	City	City
Shelbyville	60 W. Tungsten	304	76	30	30.00	.50	48.00	Yes	Both	City	City
INDIANA											
Auburn	Tungsten	50	50	80	63.20	.80		Yes	Roadway	Merchants	City
Decatur	Tungsten	200	40	90	39.50	1.85	21.00	Yes	Sidewalk	City	City
Fort Wayne	Tungsten	1,000	200	50	35.00	5.00		Yes	Sidewalk	City	City
Frankfort	Tungsten	480	96	57	35.00	1.10	.01.5	Yes	Roadway	Owners	City
Marion	Tungsten	240	48	50	22.00		4.00	Yes	Roadway	Owner	City
Mishawaka	Mazda	535	152	50	22.00			Yes	Roadway	Merchants and owners	City
IOWA											
Ames	60 W. Mazda	110	22	110	26.00		48.00d	Yes	Roadway	City	City
Chariton	Mazda	115	23	160	56.00	.90	1.50	Yes	Roadway	Merchants or owners	City
Webster City	Mazda	340	68	66-132	36.00			Yes	Roadway	City	City
KANSAS											
Topeka	Tungsten	540	108	90	59.00	2.18		Yes	In curb	Owner	City
MICHIGAN											
Grand Rapids	100 W. Mazda	193	196	75	42.45	1.60	1.25f	Yes	Sidewalk	Owner	City
Ithaca	40 W. Mazda	784	88	80						City	City
Marshall	100 W. Tungsten	88	88q	66	35.00	.58		h		City	City
MINNESOTA											
Shakopee	Mazda	10	2	300	35.00			No			
MISSISSIPPI											
Yazoo City	Mult. Tungsten	26	13	75	21.00	.35		Yes	Roadway	City	City
MISSOURI											
Columbia	100 W. Mult. Mazda	470	127	60	70.00	1.25	.02½f	Yes k	Brick Point	City	City
Lebanon	60 & 100 W. Tungsten	131	39	80	27.00m			No		Merchants	City
NEBRASKA											
Crete	Mazda	26	26	125	29.00			Yes	In curb	Merchants	City
Hastings	40 W. Mazda	5	50	75	55.00	.50	.05f	Yes	Roadway	Merchants	City
Schuyler	Mazda	160	35	175	25.00			Yes		Merchants	City
OHIO											
Hamilton	40 W. Tungsten	325	65	50-60	32.50			Yes	Gutter	City	City
Napoleon	Tungsten	210	arches			o		No		City	City
PENNSYLVANIA											
Chambersburg	Tungsten	32	4	25		p				City	City
SOUTH CAROLINA											
Orangeburg	75 & 100 W. Mazda	120	arches			.34		No		City	City
TEXAS											
Austin	6 Amp. Mult. Arc	76	76	100	35.00		48.00	h	Sidewalks	City	City
Galveston	100 W. Series Tungsten	50	50	380	60.00	.75		q		City	City
VERMONT											
Burlington	100 W. Series Tungsten	25	5	50	50.00			r		City	City
WISCONSIN											
Jefferson	Tungsten	8	8	25	30.00			r		City	City
Kaukauna	Mazda	78	26	60	35.00	80.00s		Yes	Sidewalk	City	City
ALBERTA, CANADA											
Calgary	25 W. Mazda	40	8	95	37.50			h	Sidewalk	Merchants and Owners	City
Lethbridge	30 W. Gem	160	8 arches	120			24.00t	No		City	City
	150 W. Tungsten	120	3 arches	120			2.50t	No		City	City
	170 W. Tungsten	170	34	75	60.00	1.37	45.00	Yes	Sidewalks	City	City
	300 W. Tungsten	300	75	100	40.00			No		City	City

(a) 3-conductor lead cables. (b) Total cost for year. (c) Installed by subscription of merchants. (d) Total paid by city to electrical department. (e) Installing standards, \$15 each without lamp. (f) Per K.W.H. (g) Lamps suspended in strings. (h) Steel taped cables. (i) On school grounds, and school fund pays installment and maintenance, city provides current. (j) Per month for all renewals. (k) Submarine cable containing 3 No. 8 conductors. (l) 100 W. Lamps at stop of standard burn all night. 60 W. pendant till midnight. (m) In place. (n) \$1.00 per lineal foot paid monthly. (o) Installment \$10.00 per arch. (p) On public square. (q) Lead cable in trough filled with asphalt. (r) Simplex armored cable. (s) Per standard. (t) Total per arch per year; (u) City pays half cost.

NEWS OF THE MUNICIPALITIES

Current Subjects of General Interest Under Consideration by City Councils and Department Heads—Streets, Water Works, Lighting and Sanitary Matters—Fire and Police Items—Government and Finance.

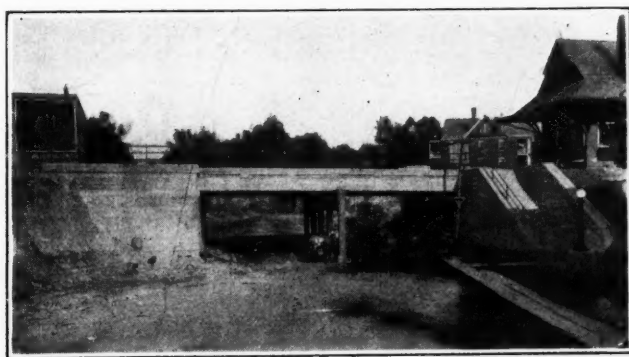
ROADS AND PAVEMENTS

Failure to Improve Sidewalks Not Jailable Offense.

Gainesville, Tex.—The paving ordinance by which the city tried to force the building of sidewalks by making refusal to do so a finable and jailable offense, has been declared unconstitutional. This was a very important decision, as some of the most prominent men of the city were involved, all of whom had contributed funds toward fighting the ordinance.

Subway Nearing Completion.

Takoma Park, D. C.—An illustration is given of the subway beneath the tracks of the Baltimore and Ohio Railroad at Cedar street, Takoma Park, which has been under construction for the past year, is expected to be finished by



Courtesy the Star, Washington, D. C.

NEW SUBWAY AT CEDAR STREET.

December 1, possibly a little sooner. The subway was authorized by Congress two years ago and the sum of \$50,000 appropriated. The concrete structure supporting the tracks of the railroad has been completed and the finishing touches are being put on the waiting station of the Baltimore and Ohio Railroad and the concrete steps which form a part of the abutment, the main entrance from the street level to the station. In order to give the subway a proportionate width it was necessary to cut in half several of the buildings on the south side of Cedar street and move the waiting station of the railroad company a considerable distance south of its former location. The subway has a width of seventy-five feet, the deepest point being eighteen feet where the Baltimore and Ohio railroad tracks cross over the subway bridge. On the north side of the subway there will be constructed an eight-foot cement sidewalk, which will be about three feet above the level of the subway, where it passes beneath the subway structure supporting the railroad tracks. A walk of the same width also will be constructed on the south side for pedestrians, but this will only be about ten or twelve inches above the roadway level.

The concrete bridge supporting the Baltimore and Ohio tracks is supported in the center of the roadway by steel pillars, which also divide eastbound and westbound traffic. The surface of the roadway and the approach into the subway will be of westomite. On the east and west sides the heavy grades will be constructed with a heavy concrete base with a two-inch wearing surface of westomite. Beyond these points the road surface will be of macadam.

Good Road Extends Through Two Counties.

High Point, N. C.—The citizens of Ashboro and Randolph county have built an excellently graded and graveled road from their county seat to the Montgomery county line. This connects with a splendid road across Montgomery and Moore counties all the way to the Cumberland

county line. This new road will be extended soon from Ashboro north to Randleman, and from there very likely still farther north to Greensboro. In whatever direction extended, however, it will be within eight miles of macadam at Archdale, and it is the opinion that High Point should arrange to put this eight miles in the proper condition, and it is probable that as soon as the Winston road is completed, which will be soon, the building of this new connection and the strengthening of the Ashboro road all along the line will be taken up.

To Build Roads With Auto Taxes.

Sioux City, Ia.—That all of the auto taxes should be expended for good roads, was the statement of Thomas H. McDonald, engineer of the state highway commission. Mr. McDonald declared that the tax amounted to more than half a million since it was authorized two years ago. He declared the net results of the funds to date had disappointed the motorists with regard to the actual road work done. Mr. McDonald figures that the building of between 10,000 and 15,000 miles of good roads would connect each of the trading points in the states with roads running different ways.

Ada Asks Good Roads.

Ada, Okla.—The good roads boosters of Ada are now working on another plan to build a few miles of model road for the double purpose of making it easier to get to Ada and as an object lesson to the public in general. A competent engineer will be employed to make plans and an estimate of the work after which further steps will be taken in the matter. As little assistance can be expected from the county or township, it will be up to the business interests of Ada to handle the proposition. It is planned to improve the three-mile stretch of road from Ada to Pecan Grove schoolhouse and three miles of the road to Center. At present the farmers of those parts are badly handicapped in coming to Ada because of the bad roads, but with these improvements it is reasonable to believe that the traffic will greatly increase.

May Teach Road Building.

Columbus, Ohio.—Road building may be made one of the courses of study at the Ohio State University. The Ohio Good Roads Federation will ask the university to do this. State Highway Commissioner James R. Marker is an advocate of the idea. He favors a course of instruction lasting six weeks to be open to engineers, county commissioners, township trustees and others interested in road construction. The Kentucky state university has a course in road making and much good is being derived from it. The Good Roads Federation says that there is a great lack of knowledge as to the manner and method of road building and maintenance throughout the state and that the state suffers from the lack of skill in the public expenditures for these purposes. The Federation would like the course to be given in the winter when those who are engaged in road building are not busy.

New Cement Bridge Over Tory Brook.

Milford, Conn.—The work which Contractor C. V. Sewell has had under way for some time of constructing a cement bridge over Tory brook at the foot of Rogers avenue is now completed and as soon as the reinforced cement slab which forms the floor of the bridge is thoroughly dried it will be thrown open to the public. The work of putting in the foundations of this bridge, which rest on piles driven in the mud, was made somewhat lengthy by reason of its being impossible to work in the excavations in which the foundations were laid except at low tide and only a short time each tide. When the lower part of Rogers avenue was built it was done by throwing brush, trees or anything handy and that would sustain weight in the mud of the meadows along the route and then putting dirt

and gravel on top of this. Mr. Sewell and his men had to dig through all this when they made their openings for the foundation walls of this bridge and this further delayed the work. When the foundations were gotten above high water the work went on more rapidly and the work of laying the floor did not take a very long time when it was reached. All that remains to do now is the covering of this floor with dirt when it has gotten properly dried out and then the town will have another bridge which will last for many years at no future expense for repairs or maintenance.

Will Work Prisoners on Roads.

Jackson, Mich.—Prisoners serving sentences in the county jail will be placed at work in building roads in Jackson county. During the present session of the supervisors an appropriation of \$74,585 was made for the building of good roads in this county. The road commissioners now plan to use a number of the prisoners in the construction of the highways and application will probably be made by the commissioners at the present session of the board. It is the plan of the commissioners to work the prisoners in the gravel pits this winter.

Bridge and Drainage Improve Street.

Corpus Christi, Tex.—Work has begun on the erection of a concrete bridge on Chaparral street to replace the wooden structure that has been in use for many years. The bridge is across the arroya in the 200 block and is being built by the Sherman Concrete company. The work will be completed within twenty days, according to the contractors. The company is also at work on building storm sewers on Carancahua and Tancagua street and rapid progress is being made on the work. With the storm sewers completed throughout the city, it is hoped to do away with the standing ponds of water that fill the city streets for several days after each heavy rain.

Trolley Company Aids Paving.

Fort Worth, Tex.—Work of repaving Houston street has been begun by the Northern Traction Company and the work will be pushed with all possible dispatch. In fact, in order to facilitate matters and prevent inconvenience to the public as far as is possible, the street car company announces that day and night shifts will be used. It is the intention of the city to keep its end of the work up with that of the traction company.

Convicts to Build Good Roads.

Temple, Tex.—The members of the Bell county commissioners court have returned from Dallas, where they purchased the necessary supplies and machinery for building the graveled road between Temple and Belton, which is to commence Nov. 1. County convicts will be employed on this work, which is much in the nature of an experiment. Dan Crow, who recently resigned as manager of the Ramsey state convict farm at Brazoria, has been selected as foreman for the road-building work, with W. J. Kennedy as guard. If the experiment proves successful, as the commissioners are led to believe it will, the era of good road building in Bell county will have dawned.

Finish 78 Miles Good Roads.

Brooklyn, N. Y.—One of the most promising developments in the way of helping real estate in Queens is the near completion of the splendid system of 105 miles of bitulithic cement main highways being built in the borough, 85 per cent. by the city at large and 15 per cent. by the borough. Seventy-eight miles of this great system to cost over \$2,000,000 are already completed, and it is expected to have the entire system completed before the winter season closes in and stops work. It is now possible to take a continuous trip of over forty miles over some of the best suburban highways in the world. A start can be made from Flushing, thence over the Causeway to College Point, thence to Whitestone, thence to Willet's Point, thence to Bayside and from Bayside over the Rocky Hill road and Lincoln avenue

to Queens, thence over Springfield avenue to Merrick road with various alternate routes possible. Thence over the Merrick road one can return to Jamaica and by Hoffman Boulevard to Long Island City. In ten days Jackson avenue will be completed from Travis Meadow road to Shell road and the improvement is all completed from the Queens County Court House in Long Island City to Travis Meadow road. From the court house west, over Jackson avenue to Borden avenue, wood block pavement is being laid. It is expected to have this completed before cold weather, giving a first-class road over the entire length of Jackson avenue to Flushing Creek. Broadway, through the town of Flushing, will be completed in ten days, all but three-quarters of a mile of granite block paving between Bayside and Douglaston.

Plans to Restore Famous Shell Road.

Mobile, Ala.—If plans of the Mobile Chamber of Commerce and Business League are carried out the Bay Shell road, most famous of all Alabama driveways, will be restored. The magnificent drive, which extended six miles along the shores of beautiful Mobile Bay, was destroyed by the storm of September, 1906, which killed fifty-five persons near the city and devastated a large portion of the county. President John T. Cochrane of the Chamber of Commerce has named a committee which is now circulating a petition that the City Commission of Mobile take steps toward the restoration of the driveway. Whether the property upon which the road is built is owned by the Bay Shell Road Company or whether the city owns that portion which lies within the corporate limits is a matter which has not yet been decided, but Commissioner Harry T. Pillans announced recently that the stretch lying in front of Monroe Park will be improved. Several months ago the Bay Shell Road Company made the city and county an offer to sell the road for the sum of \$10,000. The county agreed to pay two-thirds of the cost if the city would pay the other third. The City Commissioners, instead of accepting the proposal, made a counter offer to pay one-fourth of the cost. The county refused to capitulate and the matter rests.

SEWERAGE AND SANITATION

Sewer Nearing Completion.

Trenton, N. J.—The work of the Street Department of the city on South Warren street near its junction with Lafayette and Lamberton streets on a permanent drainage system is nearing completion. The gutters have been depressed and adequate outlets have been placed. Repaving has still to be done. For a long time the people of the vicinity have been troubled with the poor drainage and their cellars have often been flooded. This condition will be prevented by the changes which have been made.

Make Rapid Progress on Sewer.

Chattanooga, Tenn.—Smallwood & Co. are making rapid progress on the Cowart street sanitary sewer, and it is expected that the job will be finished before the first of the year. The brick work is now within a block of Main street, with the exception of the tunnel work under the Nashville, Chattanooga & St. Louis railway. The sewer is being constructed out of the recent sewer bond issue and is one of the many sanitary and storm sewers recommended by the city engineer. Another important sewer under the bond issue, the Highland Park storm sewer, is nearing completion and, with favorable weather, will soon be ready for use. The work is completed from Union avenue to Vance avenue, and the excavation at the south end is rapidly approaching completion. This sewer will drain a greater portion of the territory between Greenwood avenue and Holly street and south of Chamberlain avenue.

Commission Soon to Complete Work.

Louisville, Ky.—The Commissioners of Sewerage of the City of Louisville will finish the work of constructing \$3,000,000 worth of sewers for the city early in January, and at that time its existence will be terminated. Such

was the announcement made by Charles P. Weaver, secretary and treasurer of the commission. The last piece of work is now being done by the commission, that of confining Beargrass creek in the stockyards district. Although the work of the commission is virtually completed, sewer building will continue, under the direction of the Board of Public Works with Engineer Roy W. Burks in charge, there being a fund of \$1,387,500 available from the sale of the city's holdings in the Louisville Gas Company, amounting to 9,250 shares. When this work is completed, Engineer Burks has stated the system will be 90 per cent. complete for the entire city. P. L. Atherton is chairman of the commission, which is completing its work; Oscar Fenley is vice chairman; W. C. Nones and Alfred Selligman are members; Charles P. Weaver is secretary and treasurer, and J. B. F. Breed is engineer.

Sewer Diggers Mine Coal.

Scranton, Pa.—The question of the ownership of coal lying under the streets of the city is now at issue as a result of the mining operations of Jones & Markwick, the sewer contractors, who struck a vein yielding them 400 tons while driving a sewer tunnel on Prescott avenue. As soon as it was announced that they were mining the coal the Scranton Coal Company made claim for royalty on all coal taken out. The sewer men refuse to pay on the ground that the company does not own any coal under the city streets, the law only giving them the right to drive gangways there.

WATER SUPPLY

Township Would Sell Reservoir for Taxes.

Boonton, N. J.—Unable to collect \$9,000 in delinquent taxes from the Jersey City Water Company, the Hanover Township Committee is advertising that portion of the company's reservoir lying in the township for sale at auction November 12. The property is said to be valued at \$510,000. The water company is indebted to Boonton for several thousand dollars also, but the Common Council has taken no definite action toward collection so far.

Water Works Filter Plant Still Unsatisfactory.

Bellaire, N. J.—The water works filter plant has been tested again and once more proved a failure. Water was pumped into the tank, which will hold about 600,000 gallons of water, and when about full the northeast wall gave way with a loud report and the water rushed out. A crack about an inch wide was made in the wall and it will be some time before this is repaired.

Construction of New System Under Way.

Newaygo, Mich.—The new water works system, for which the village is expending \$17,000, is well under way. Work is being pushed on the power house and it is expected that a standpipe, 60 feet in height, will soon be started. On account of getting such a late start it is highly improbable that the mains will be laid until spring. When completed, Newaygo will have one of the best water works systems in the state, from the standpoint of good water and excellent fire protection.

City Water Collections Increased.

Dallas, Tex.—Collections in the City Water Department thus far in the fiscal year are about \$10,000 ahead of the same period last year. It is expected that the year will go about \$25,000 ahead. Secretary-Collector Floyd E. Ard states that the results have been good from the installation of meters. About 6,500 are in service. It has been necessary to repair and replace about 500 out of these because of a breakdown. The city has ordered 2,000 more, and it is expected that within the calendar year about 8,000 patrons will be on the meter service, about one-third of the total.

Fail to Complete Reservoir On Time.

Toledo, O.—Toledo's new 15,000,000 gallon reservoir, at Broadway and Stebbins street, should have been completed by October 10, 1912, according to the contract between the city and the Beers-Offutt Construction Co., of Ft. Wayne,

Ind., the contractors. Indications are that it will be early in the summer before the job is finished. Two weeks after the work was to have been at an end finds only part of the concrete work in place and some excavating still to be done. The city under the contract can claim a forfeit of \$50 for each day after October 10 that the reservoir is not finished. Service Director J. R. Cowell says he cannot say at this time whether this amount will be withheld from the amount to be paid the contractors. Before the work is completed next summer the city could claim several thousand dollars according to the contract. "I will wait until the work is finished before making my decision on the matter of collecting the forfeit," said Director Cowell. "The city is in no way inconvenienced by the fact that the reservoir is not completed in the time specified in the contract. If conditions at the time the work is completed warrant, then the forfeit will be claimed. I prefer to let the contractors explain why the reservoir is not finished."

The work was awarded to the Beers-Offutt Company because their bid was more than \$15,000 lower than the next highest bidder. They will receive about \$116,000 for the work, which is much lower than the estimated cost of the improvement.

Improving Water Pump.

Greenville, Tex.—The large pump which will convey 25,000,000 gallons of water in twenty-four hours has been installed at the waterworks plant in Greenville. The new mammoth pump will be used when the rains cause the water to rise in Sabine river, to pump the water over into the large reservoirs. Work is being pushed on building the third water reservoir at the waterworks plant. When completed it will cover about sixty acres of land and the cost for making it will be about \$70,000.

Water Found Contaminated.

Jeanesville, Pa.—An analysis of the water taken from the Jeanesville No. 7 reservoir proved the same to be unfit for domestic use and it is likely that the town will be supplied from the mains that connect with the Hudsonale line on the top of the mountain. The No. 7 dam, which has furnished the town with drinking water for a number of years, is situated at the base of the mountain that divides the town from Hazleton and possesses one of the best artesian wells in this section. The Spring Mountain colliery is situated on the mountainside and it is the belief of many that the water became contaminated from the oil and sulphur from the colliery.

STREET LIGHTING AND POWER

Want Ornamental Posts.

Fort Wayne, Ind.—That the scheme proposed by Mayor Grice, Controller Cutshall and Superintendent Frank Dix, of substituting ornamental light standards for arc lamps as an illumination medium in the residence districts has registered, is evidenced by the fact that already residents along Rudisill boulevard and Dayton avenue have asked the Board of Park Commissioners to include the posts in the improvement of their thoroughfares. The park commissioners will informally discuss the matter at the next meeting, but will not in all probability adopt any set line of procedure relative to such requests. The establishment of such systems on streets would probably come under the jurisdiction of the Board of Works, as do street and sidewalk improvements.

Recommends New Construction for Nisqually Station.

Tacoma, Wash.—While advising additional construction in connection with the city's hydro-electric power plant on the Nisqually River to insure continuous service, Special Investigator Arvid Rydstrom states that all of the new work he proposed could be paid for out of the profits of the plant and would not require additional assistance from the taxpayers. The plant as it stands will safely deliver 8,500 more horsepower than the city is using now—nearly double the present amount consumed—at all times of the year. The trouble that will be experienced if a greater quantity of current is needed is that the frozen condition of the Nisqually River will not permit of the flow of enough water to make it, he said. Mr. Rydstrom has filed

a report on the Nisqually system with the council covering the entire work. He quotes from the figures prepared by the United States Geological Survey on the flow of water in the Nisqually River. The report says the volume varies from 71,850-horsepower in flood times to 11,350-horsepower, which is the lowest ever recorded. This latter measurement was taken in October, 1909. Mr. Rydstrom advocates the construction of the \$75,000 auxiliary power plant on the Green River water system pipe line at Mc-Millan, where the waste water can be utilized to develop 1,000 or more horsepower. The plant will not exceed \$75,000 in cost, the investigator says. Another scheme to increase the storage capacity at the power plant, which is urged in the report, is to build a flume line from Mineral Lake. He says the present storage capacity will operate the plant for between seven to ten hours without more water from the river. It is also suggested as another solution that the city build a steam plant in the city which would have a capacity of approximately 5,000-horsepower. This plant would furnish steam for heating purposes and be sold in the downtown district.

New Lights for Westfield.

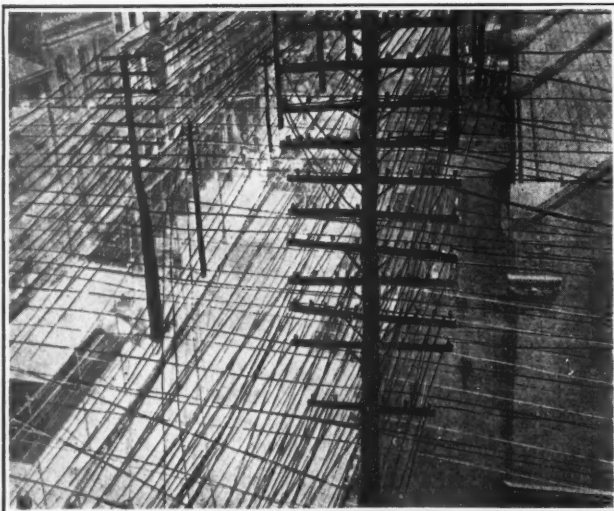
Westfield, Mass.—The twelve new electric lights that have been placed on North Elm street, and of which number six are located on Depot square, will be lighted for the first time some time about the middle of next week. The residents of the North Side are very proud of the new improvements that are now under process of construction, and the turning on of the juice that will bring the North Side into the light is of much importance.

Light Plant Had Big Month in September.

Richmond, Ind.—Superintendent N. H. Johnson of the city light plant has submitted his report for the month of September. It follows: Receipts, \$7,609.42; operating expenses, \$5,951.78; building and equipment, \$1,339.25; sinking fund, \$660. Actual cash receipts, \$6,217.78; operating expenses, \$5,951.78, leaving a profit of \$265.40. The sinking fund now contains \$15,635.45 and the municipal fund, \$36,516.78. The semi-annual payment on the interest and commission on the \$144,000 bonded indebtedness of the plant is due in September. This sum, amounting to \$2,883.60, was paid out of the September earnings. The actual cash balance had this sum not been paid would have been \$3,149.

Light Bill Is \$15,000.

Janesville, Wis.—It costs the city of Janesville approximately \$1 per capita for lighting, according to Mayor Feathers. The annual appropriation for lighting, which will be made at the council meeting, will not be increased, but will remain at \$15,000. The high cost is due not to excessive rates, but because of the number of lights used.



Courtesy of the Baltimore News.
BEFORE AND AFTER REMOVAL OF POLES AND OVERHEAD WIRES AT CALVERT AND GERMAN STS., BALTIMORE.

Must Not Paint Street Lamps.

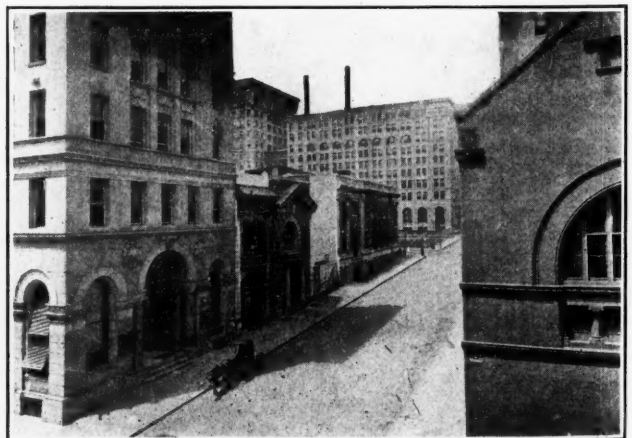
Montclair, N. J.—The police authorities have been instructed by Acting Mayor David Henney to report all street lamp globes that have been painted by householders to deflect the light from their homes. Although it is a violation of the town ordinance, many citizens have painted the lamp globes because the bright rays from the street lamps shine into their bedrooms at night and disturb their slumbers. The practice has become so common of late that the authorities decided to take steps to stop it. Hereafter any person responsible for painting the globes will be arrested and prosecuted.

Municipal Plant Is Big Producer.

Pasadena, Cal.—The municipal lighting plant of Pasadena, after four and a half years' operation, continues to be the biggest revenue producer of the several public utility projects conducted by the city of Pasadena. According to a report just compiled by C. W. Keiner, superintendent, the municipal plant has earned 12.75 per cent. interest on the investment by the city of \$325,000. The present value of the plant is estimated at \$552,000. Total receipts from the municipal plant from the sale of light and power during the past year were \$123,485. After paying all operating expenses, interest on bonds and allowing for depreciation, a surplus of \$19,000 remains. According to Superintendent Keiner, the presence of the municipal plant in the local field saved Pasadena consumers of electricity the sum of \$198,952, during the past year. Keiner bases this assertion on the fact that rates to consumers before the advent of the municipal plant were 12½ cents per kilowatt hour, while at present they are 4 and 5 cents per kilowatt hour. Under the present rate, consumers paid the municipal plant \$81,389 during the year. Under the old rates the amount they would have had to pay would have been \$180,865. The saving under the reduced rate was \$99,476. Superintendent Keiner declares that as much was saved patrons of the Southern California Edison Company as was saved for municipal consumers, making the total sum \$198,952.

Street Lighting in New Castle.

New Castle, Pa.—Within five weeks a new contract for street lighting here has to be made by the city. A bid which has yet been unopened by councils contains a bid of \$55 per light on the basis of the city specifications. Superintendent Pooler of the electric company which supplies New Castle has made a bid of \$48 per arc light and also offered a reduction in the commercial rating. The same proposal as was made to Sharon will be made here, it is expected, as Superintendent Pooler says that New Castle will probably receive the same deal as any of the other towns supplied by the company. The city has been paying \$70 and \$75 per arc light, and no new contract will be signed by the city unless a big reduction is made. The electric light company is getting anxious to have the contract with this city renewed, the effort being to secure a five-year contract.



Carnival Opens City's New Lighting System.

Gainesville, Tex.—All the necessary fixtures for Gainesville's Great White Way have been installed and the lights turned on. At a prearranged signal at 7 o'clock in the evening all the whistles in the city began blowing and the lights of the big carnival, which opened for the week under the auspices of the Young Men's Business Association, and the lights of the White Way and regular street lights were turned on, making California street a solid blaze of light. The Young Men's Business Association, projector of the White Way, is in its infancy and is now working for funds with which to begin an advertising campaign in The Dallas News and other large newspapers, endeavoring to locate factories and immigrants in Gainesville.

Planning Junction City's White Way.

Ogden, Utah.—The committee appointed by the Weber Club to propose a system of street lighting on Washington avenue has formulated an agreement to be signed by property owners. By the terms of the agreement the property owners will, on or before Dec. 1, 1912, pay 75 cents for each foot of frontage into a fund to defray the expense of installing and lighting for a period of one year. After that time the city will assume all expenses of maintaining and lighting seven regulation street arc lights to each side or face of the fourteen blocks. The arc lights are to be supported on steel poles which will also support trolley wires of the Ogden Rapid Transit Company. The wooden poles used at the present time will be removed from the center of the street. In order to facilitate work, a chairman has been placed in charge of each side of a block in the district.

Tampa's Great White Way.

Tampa, Fla.—With all but one property owner signed up for the Great White Way improvement on Franklin street, from Jackson to Fortune, and the board of trade executing a contract with the Tampa Electric Company for that little strip, the Tampa Electric Company will proceed at once with the improvement and it will be in full operation by Dec. 20. Cluster lights on ornamental iron poles will be placed at 100-foot intervals on each side of the street.

Will Substitute Electricity for Gas.

Providence, R. I.—Employees of the Narragansett Electric Lighting Company are replacing the 934 Welsbach gas lights with electric lights. The gas lights will all be out by the first of January and then the city lighting will be wholly by electricity. The changing of the gas lights to electric lights will mean the placing of a large number of poles and the rearranging of circuits. All the necessary arrangements have been made between the company and R. L. Brunet, the city electrical engineer, and the work will be pushed.

Ready to Put in the Lights.

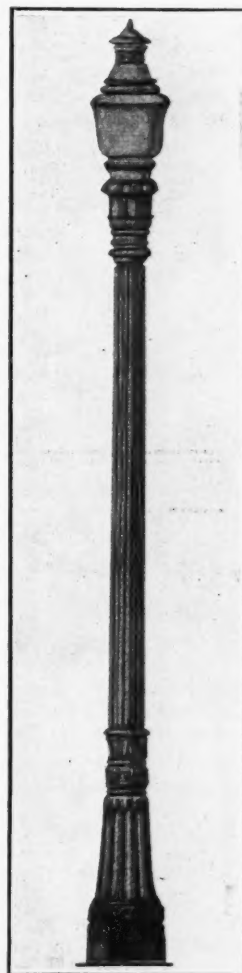
Haverhill, Mass.—The Haverhill Electric Company is all ready to install the new decorative system of street lighting in Haverhill. It cannot do so, however, until the locations for the poles are granted by the municipal council. The council has shown a disposition not to grant these locations until the \$10,000 fund being collected by the board of trade and the Advertising Club is turned over to them. About \$6,000 has been collected and every effort is being bent to get in the rest. Posts, conduits, wires and all the necessary paraphernalia is on the way, following the requisition of the electric company, which had in rush orders for the material, believing that the money would be collected. The lights are altogether different from those on exhibition in Haverhill earlier in the year. The ones which are to be installed will be on the top of ornamental poles, over 16 feet from the ground, and will throw a brilliant glow on to the sidewalk, over the street and up along the buildings. There are to be 64 in all, 15 of them burning all night, and they are over four times the brilliancy of the present arc lights which they will more than supplant.

Chattanooga White Way.

Chattanooga, Tenn.—As the final guarantee of a great white way for the city of Chattanooga the board of commissioners has passed an ordinance granting to the Retail Merchants' Association the right to erect lamp posts and install electric lights upon the main thoroughfares of the city. According to the specifications 114 inverted lamps will be used.

Artistic Standards Designed for "White Way."

Lynn, Mass.—Experts of the lighting systems in vogue in the United States who have been working on the plans for Lynn's Great White Way have declared that the local systems, when completed, will be the most modern and give the greatest volume of uniform light of any in the world. Active work on the installation of this lighting system has been going on for over a week, the sidewalks of Munroe street from the corner of Central avenue and those on Market street having been torn up for the laying of the conduits. It is planned to have the system complete for operation by Dec. 1, in order that the merchants who have responded to the call of the Board of Trade and the Merchants' Association may receive the benefit of the brilliancy afforded by the lights during the holidays. Each of these lights will be of 3,000 candle power and will be set on a pole 16 feet 3 inches in height as illustrated. The design of the poles is considered to be of the most beautiful of any yet devised for a similar purpose. The General Electric Co. is furnishing the lamps, and wishing to have a design of an original nature, representatives of the company conferred with the Lynn Board of Trade and Merchants' Association and Prof. E. J. A. Duquesne of Harvard University was decided upon as the one to draw the style of pole. Professor Duquesne designed the lamps especially for the city, and Lynn may rest assured that no others like them will appear anywhere else in the world. The designing of these lamps was one of the first bits of work done by the professor after his coming to this country. He was chairman of the art commission in France, and was loaned to Harvard University in 1911 to give a course of lectures for one year. He returned to France in the past spring, but was allowed to come back to America for another year for work at Harvard. Immediately upon his arrival he was given a professorship in the architectural department at Technology. He is one of the leading experts in his line in France, his duties as chairman of the commission compelling him to pass upon any piece of metal or wood which is used in any part of France for street decoration or in connection with any public construction.



New Light Poles Being Erected.

Atlantic City, N. J.—The Electric Light Company has begun the restoration of its poles along Pacific and Pennsylvania avenues in conformity with the orders issued by the city electrical bureau. "The lighting company is acting in compliance with the request of the bureau," stated Special Electrical Expert McLaughlin, "and already they have made a number of improvements in the things, to which we called their attention. The company seems to

show a desire to comply with the recommendations of the department. On Pacific avenue between Pennsylvania and Boston a good many poles will have to be replaced with new ones, and this work the company has under way. A good many of the Pacific avenue poles have already been replaced. All along Pennsylvania avenue new poles have been put up wherever the bureau directed that they were needed."

Line Will Supply Light and Power.

Rapid City, N. D.—Work has already begun on the new power line which will connect the Dakota Power Company's system at Rapid City with that of the Consolidated Power and Light Company of Deadwood and Lead. This connecting line will pass through the towns of Tilford, Black Hawk, Sturgis, Whitewood and several other smaller villages en route to the northern hills, and will make it possible to supply these smaller places with power and light. Since the completion of the hydroelectric plant of The Dakota Power Co. at Big Bend, on Rapid Creek, there is an immense surplus of power which, it is believed, will be entirely disposed of, when the new line is completed. The line will carry fully 60,000 volts, and will be on steel poles.

White Way for Dickinson.

Dickinson, N. D.—About three-fourths of the 84 iron posts to be used in the initial installment of the "white way" in Dickinson stand erect on their concrete foundations ready to receive the arms, globes and wiring that must be attached before the electric current is connected and the city streets are illuminated according to modern methods. All material required for the installation and connecting up the current is available excepting the transformers, which have been shipped. They can be placed in three or four days after their arrival, which will be before the other work is finished.

FIRE AND POLICE

Fire Alarm Broken; 200 Are Homeless.

Philadelphia, Pa.—A broken or grounded wire in the circuit prevented the Fire Department from receiving four different signals that were sent in, and a row of twelve buildings in Kensington were destroyed, making 200 people homeless. It was the first failure of the automatic system. The fire started in a small shed and was detected by a policeman, who sent in alarms from three boxes without response. He then tried to telephone, but the wire was also grounded. When the firemen finally were notified, two hours later, the property was destroyed.

Fire Tower in Commission.

Louisville, Ky.—Louisville's new fire tower began its official career when the various circuits which have for many years centered on the third floor of fire headquarters were "plugged out" in the old tower and quickly "plugged in" at the new headquarters on the third floor of the City Hall Annex. It took just two and one-half minutes to make the entire change, and no circuit was "dead" for more than three or four seconds, so that there was no chance for an alarm to be delayed. Captain Charles F. Gall, chief of the Fire Alarm Telegraph Corps, had charge of the change. He was assisted by Captain William J. Raggio and Captain William G. Day. The telephone circuits were changed at the same time. The new fire tower, which will be one of the best in the entire country, will cost the city in the neighborhood of \$10,000. Owing to numerous delays in the shipment of the equipment it will be some time yet before it is completely finished, but the unfinished work is more in the way of improvement and the lack of complete equipment will not impair the efficiency of the service in any way.

Schoolboys Will Police City Property.

Fort Worth, Tex.—Former City Commissioner Sam Davidson's suggestion that boys be organized into a sort of police force to protect shade trees and other property has been acted upon by Park Superintendent Vinnedge, who has written a letter to Superintendent Cantwell, of the

city schools, embodying the plans. Many fine trees are thoughtlessly damaged by boys who climb them or break the branches, and it will be the duty of the police squad of organized boys to correct this trouble as well as to prevent the breaking of windows and the damaging of various kinds of property wherever possible. L. J. Tackett, special agent of the State Agricultural Department, who came from Dallas to confer with Superintendent Vinnedge concerning the deadening of many trees by borers or other insects, has agreed to return and wage a systematic war against the destroyers if citizens will pay for the work. In his opinion, the majority of dead trees were destroyed by the San Jose scale as well as borers, and he estimates that to properly spray the trees would cost the owners about \$1 per tree.

Sprinklers and Insurance.

Minneapolis, Minn.—At a recent banquet of the Minneapolis association of credit men, Walter C. Leach, president of the Northeastern Fire & Marine Insurance Company, referring to the \$2,500,000 fire loss suffered in 1910 by the city of Minneapolis, came out strongly in favor of automatic sprinklers. He stated that insurance companies were making more money on the 25c rate with automatic sprinkler protection than on the \$2 rate without the sprinklers.

Theatre is Built for Watching Fire Play.

Berlin, Germany.—The Dusseldorf fire brigade is undertaking some original experiments with the object of discovering additional safeguards against fire in theatres. The experiments are the outcome of the recent fire at the operetta theatre, the Theatre des Westens, in Berlin, which completely destroyed the proscenium, necessitating the closing of the building for the whole of the coming season. A building is to be erected on a piece of ground measuring 50 feet by 80 feet, with the auditorium 30 feet and the proscenium 40 feet high. The building will be constructed mainly of steel and armored concrete. Special observation doors will be fitted in the front and the rear, and there will be two kinds of fireproof curtains, one of the usual type, a drop curtain, and the other moving in halves horizontally. The building will also be fitted with seats similar to those of a theatre, and several different processes for rendering them fireproof will be tested. The experiments, which will number more than a hundred, are expected to be continued for some months.

Annual Fire Inspection.

Chattanooga, Tenn.—The captains of the local fire department have begun their annual inspection to discover infringement of the city fire ordinance. The captains of the various companies are allotted certain districts and all refuse and other inflammable materials are being removed as rapidly as they accumulate. The police department is co-operating with the fire department in order to enforce the orders submitted to the various property owners.

New Building Laws For Fire Prevention.

Petersburg, Va.—Members of Common Council and the Board of Aldermen, at a meeting of the Virginia Fire Prevention Association, promised to use their influence in the city governing bodies to secure for Petersburg a building code and a building inspector. The meeting was addressed by President J. A. Waller, of the association and by the secretary, A. H. Harris, of Richmond, who with some forty other special agents representing fire insurance companies doing business in Virginia were present at the meeting in Petersburg.

The speakers impressed upon the gathering the value of fire prevention as well as of improving the efficiency of the fire-fighting machinery of a city. Members of council and of the aldermen also spoke, telling of what Petersburg has done recently in appropriating some \$10,000 for improving the fire department. The visiting fire insurance men inspected some 650 risks on which insurance is carried and reported they had found more than 200 of them subject to criticism. Of this number, however, there are but ten in which cost of removing defects will not exceed \$25.

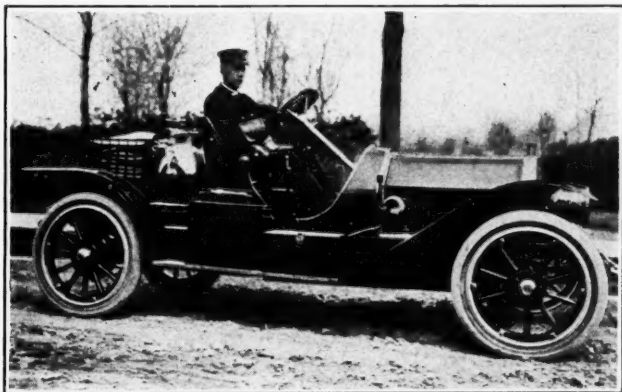
MOTOR VEHICLES

Capt. Schoppe Gets First Auto.

St. Louis, Mo.—The first of the new runabout automobiles which are to be used by the captains and lieutenants of the St. Louis police districts has been sent to the Fourth District for the use of Capt. Schoppe and Lieut. Deatherage. Others will be installed as rapidly as received.

New Auto for Fire Chief.

Gloversville, N. Y.—The illustration following gives a view of the new automobile purchased for the use of the Fire Chief of the Gloversville Fire Department. This car is a 40 horse-power Velie roadster, capable of great speed.



FIRE CHIEF'S NEW AUTOMOBILE, GLOVERSVILLE, N. Y.

It is equipped with electric lights and self-starter, and carries a full chemical equipment. The chief has heretofore used a wagon, but the auto is much cheaper to maintain, besides enabling the chief and his assistant to arrive at a fire very much more quickly than before. The wagon recently used is now being put to good use by the Engineering Department, which formerly hired a rig of a local livery. This car was purchased last January, and although there was some opposition to its purchase at that time, it is now generally conceded to be a great success.

New Seagrave Truck Arrives.

Corry, Pa.—The new Seagrave truck purchased for the fire department has arrived. The big machine is finished in light white with gold trimmings. On the sides of the immense hood are painted two scenes, one from Findley Lake and another attractive view of the water company's pumping station. The machine is equipped with a 6-cylinder 793-10 H. P. water-cooled Seagrave motor, rated by A. L. A. M. formula. There are two devices for warning signals to the public, one is an electric Siren and the other a Husk horn, operated from engine exhaust.

Auto Truck Hits Team of Horses.

Barberton, O.—Barberton's new auto truck, the pride of the city, came near being wrecked when making a run to a fire. Fire was discovered in a box car on the Belt line near Hoppocan avenue, and an alarm was turned in. The auto was making a dash for the fire when it collided with a team of horses owned by a farmer. Both horses were knocked down and injured.

Demonstrative Power Machines in Road Building.

Des Moines, Ia.—A stretch of perfectly graded road, two miles long and thirty feet wide, was made in two days on the Hyperion road by demonstrating crews of the International Harvester and J. B. Adams Company. As guests of the Polk County Good Roads Club, city and county officials made an examination of the work. Two graders,

made by the Adams company, are being used on the road. They are hauled by a mammoth tractor made by the International Harvester Company. This is the first time that power machinery has been used in making roads in Polk county. During the time the visiting party was on the scene, the engine pulled the graders over a mile of the road and a perfect demonstration of the manner in which the machines work was given. The capacity of the outfit is one mile of road per day. This is faster than could be done by any number of horses and wheel graders, and the work is done at a much lower cost.

New Auto Engine Arrives in City.

Nashville, Tenn.—An American La France automobile fire engine has arrived in Nashville and will soon be given an official test. The new engine will develop from 90 to 106 horse-power and is guaranteed to make sixty miles an hour on level streets. According to Chief Rozetta, the other two engines will arrive in a few weeks. The installation of the three new engines will bring Nashville into the front ranks of fire-fighting efficiency among the Southern cities.

New Fire Engine Excels in Test.

Pasadena, Cal.—While exact results have not yet been tabulated, Fire Chief Clifford has reported to the City Commissioners that from his informal figures, compiled at the recent test of the new self-propelled fire engine he finds the machine exceeds requirements. His figures show that at the recent test the engine pumped from 800 to 1,000 gallons, whereas it is required to pump only about 700 gallons to be up to specifications. The engine will use a lot of gasoline, it was discovered, probably not making but two or three miles to the gallon, but this was anticipated, as the brake horse-power test shows that the engine develops about 176 horse-power.

President of Brazil Buys Pope-Hartford.

Nashville, Tenn.—E. O. Elliott, agent for the Pope-Hartford automobile, at Nashville, is in receipt of a letter which tells the story of the sale of a Pope-Hartford model "28" to the President of Brazil, and also the sale of a Pope-Hartford three-ton truck to the fire department of Rio de Janeiro. The letter is as follows: "We have the pleasure to inform you that we have sold to the Brazilian government two cars, one truck and one six-cylinder car. The three-ton truck was sold to the fire department of Rio de Janeiro after a hard test. The test for the sale was a good demonstration of the truck's qualities. The truck carried a load of 3 1-2 tons for a distance of five miles through a bad road of sand and mud, after a four-days' rain. The truck carried its load without any trouble or adjustments. Other trucks in competition failed to complete the run. The six-cylinder car was sold to the President of Brazil. A number of cars were called to be presented to the choice of his excellence the president. When the president looked to the Pope he said: 'Any other car can't be compared with the Pope; it is very fine, and we immediately delivered the car with disappointment to our competitors.'



PIERCE-ARROW 5-TON TRUCK USED BY PARK DEPARTMENT, BUFFALO, N. Y.

Auto Police Patrol Arrives.

Rome, Ga.—The new auto police patrol has been turned over to the city, and will be put in service at once. The machine has thirty horse-power Hudson motors, and is made to seat eight persons. W. J. Graham will operate the auto temporarily and teach the members of the police force how to drive it.

Buys Fine Engine.

Kenney, Ill.—The Village Board of Kenney has received a new 48 horse-power gasoline fire engine. With this new engine the firemen can throw four streams of water at one time with a pressure of 125 pounds. Next week a man from the factory in Michigan will go to Kenney and give a demonstration and explain how to use and care for the equipment.

Will Observe Auto Truck in Action.

Sawtelle, Cal.—The Santa Monica Fire Department will give a demonstration with its auto chemical fire-fighting apparatus to further the bond issue project designed to purchase new apparatus for the local department. A mass meeting of voters will follow at the City Hall, where the proposed bond issue of \$10,000 with which to buy an auto chemical truck will be discussed.

Test New Auto Sprinkling Wagon.

New Orleans, La.—Commissioner of Public Works Geo. Smith made an inspection and test of the new auto sprinkling wagon which was purchased by the city recently from the Joseph Schwartz Company, and which will be used for sprinkling the New Basin Shellroad, from Carrollton avenue to West End. The auto sprinkler was purchased by the city under an agreement with the Shellroad Commission that the city was to pay for the machine and furnish the water for it, and the Shellroad Commission was to operate it and take care of it.

Would Reduce Tire Expense.

Grand Rapids, Mich.—Auto apparatus tire expense was the principal business handled by the fire and police commissioners at a recent meeting of the board.

Fire Marshal Lemoine suggested that the board should attempt to secure fresher supplies of inner tubing or tires as the stock now shipped to the department is believed to have been kept on hand a long time by the dealers. This action would greatly reduce the present tire expense. All the tires on the auto apparatus in No. 1 engine house must be replaced. Sulphur used in vulcanizing has an effect on the tires. The fire marshal would have all tires ordered by the board manufactured after the orders are received, the same as the hose manufacturers do.

GOVERNMENT AND FINANCE

Municipal Telephone System.

San Francisco, Cal.—In accordance with the resolution of the Supervisors the Board of Public Works has directed the City Engineer to prepare plans and estimates of cost for constructing and completing a municipal telephone system, acquiring the necessary lands, and constructing the needed buildings. This work must be done before the proposition of authorizing a bond issue of \$6,000,000 for the acquisition of a municipal telephone plant is submitted to a vote of the people.

City Publication Issued at Memphis.

Memphis, Tenn.—"Memphis Commission Government," the new city publication, has made its initial appearance. Volume 1, No. 1, contains fourteen pages, beautifully compiled and illustrated along lines similar to the municipal papers published by the administrations of Denver, Houston, Erie, Pa., and other cities. The cover page is a layout showing the skyline of the downtown district, set off in the upper corners with miniature photographs of the city hall and central police station. The title page is given over to photographs of the mayor and the commissioners, accompanied by an account of administrative accomplishments.

The paper is replete with views of various municipal improvements, and practically every department of the city is represented with an account of its undertakings.

Twelve thousand copies were printed, and will be distributed over the United States.

Municipal Vice Department Urged.

Little Rock, Ark.—The Vice Commission, appointed several months ago by Mayor Charles E. Taylor, at its final meeting, recommended the creation of a city vice department, to which shall be referred all matters pertaining to the morals of the city.

Amarillo Favors Commission Form.

Amarillo, Tex.—Amarillo's commercial interests, represented by the Chamber of Commerce, in a recent executive meeting unanimously declared in favor of a commission form of government charter. A draft of this charter is to be submitted to the State Legislature during the first week of its session early next year. A special committee will be named to draft this document and it may be that it will be submitted to the voters before its presentation to the State Legislature for approval.

Jersey City May Vote Again on Commission.

Jersey City, N. J.—Friends of commission government have given notice that they will demand another vote soon on the question of making a change in the form of government of Jersey City. When the special election was held last year the majority against the adoption of the provisions of the Walsh act was less than 1,500, and it was claimed there were frauds perpetrated that aided in bringing about the results. Public notice has now been given to all friends of commission government to be sure to register so that they will have a chance to vote at a special election on the commission question, "which will surely," the notice reads, "be held next spring or fall."

STREET CLEANING AND REFUSE DISPOSAL

New Augustine "Cleaned Up."

New Augustine, Fla.—The residents of New Augustine have made a great improvement in the appearance of the grounds surrounding their homes. Almost every one was busy the latter part of last week "cleaning up" and the trash collected was hauled away by men engaged for the purpose by the ladies of the Village Improvement Association. This organization has still other plans on foot for the benefit and improvement of the town which will in the near future be put into operation.

Warren Council May Buy Disposal Plant.

Warren, Pa.—Council is considering purchasing the plant of the City Disposal Company, which is located in the east side of the city. It consists of an incinerating furnace and fully equipped plant. It is the property of R. A. Winger, and is valued at \$20,000. Mr. Winger has operated the plant for more than one year, charging at the rate of 50 cents per family for gathering the garbage two times a week. The Civic Improvement League, through its officers, is urging the town to make the purchase. Mr. Winger is willing to sell.

City Has Received New Street Sweeper.

Janesville, Wis.—A Studebaker patent improved "Acme" street sweeper, to replace the one destroyed about three months ago when a Northwestern train struck it on the North Academy street crossing, was received and unloaded by the city recently. It has a nine-foot broom, one foot longer than the old one. The machine is claimed to be better adapted for the purpose of removing fine dust from macadam streets, preparatory to oiling, than any other sweeper on the market. The council had this purpose especially in view when the purchase was made, as it will undertake the oiling of streets next season. The adjustment of the broom is automatic, and the operation of the machine is under easy control of the driver without leaving his seat. The Northwestern railway settled with the city for the destruction of the old sweeper for \$250.

RAPID TRANSIT

City of Omaha Adopts Hobble Car.

Omaha, Neb.—Because women in tight skirts "kill too much time" boarding high-step street cars, directors of the road announce new cars will have steps near the pavement, similar to the ones recently put into service in St. Louis.

Will Separate Races on Charleston Trolleys.

Charleston, S. C.—Charleston's new ordinance, separating the races on the street cars, has gone into effect and the conductors are having some trouble in educating the people to take the proper seats. The plan in Charleston is on the order of that in Atlanta, reserving the two rear rows of seats for colored people, the white sitting to the front of the car. The plan is flexible, allowing for the white passengers to take over the colored reserved seats where these are not occupied, and the colored to move to the front, as accommodations may be needed, when these seats are not occupied by white passengers.

Pay-As-You-Enter Cars.

Sheboygan, Wis.—The Sheboygan Railway and Electric Co. is considering the plan of changing its city cars to "pay-as-you-enter" cars such as are operated successfully in many cities. Should the company adopt the new plan it will mean an entire remodeling of all the city cars. The changes will include the removal of the partitions between the car rooms proper and the platform vestibules so that the only doors will be the outside doors. There will also be closed doors and folded steps while the cars are in motion so that while the cars are running no one can board or leave them.

One-Cent or Free Fare.

Toronto, Ont.—Mayor Hocken expresses confidence that the city will have cars running on the Gerrard street civic street railway line within six weeks. "It will not be longer than six weeks," said the Mayor, "and maybe it will be a shorter time when we will have a service on the new Gerrard street line. It will be run by the city, too. The city will operate the line on terms not yet definitely decided upon, but it is probable that we will run the cars either for nothing, or for a one-cent fare, so that the people living in the northeast section of the city may have a reasonable service in connection with the Toronto Railway Company's line, and at a reasonable cost. It is probable the city will sell ten tickets at ten cents."

MISCELLANEOUS

Traction Engine Service to Coal Field.

Denver, Colo.—Mayor Arnold in his fight on the railroads centering in Denver has started arrangements for a traction engine service between Denver and the northern coal fields. The railways charge 80 cents a ton for a haul which the mayor says should be done for 40 cents. The mayor states that he has opened negotiations with the makers of traction engines to obtain a number for the city. These he would put on the highway between Denver and the northern coal fields, and, by hauling the fuel used by the city, prove that present charges are unnecessarily high.

Municipal University Planned.

Cleveland, Ohio.—A plan has been conceived to unite the Western Reserve University and the Cass Scientific School in Cleveland, Ohio, and make them the nucleus of a municipal university. An important purpose of the university would be practical co-operation between the students and professors on the one hand and the municipality on the other. Students will gain actual practical experience, while the city will have the benefit of the enthusiasm, skill and good will of well-trained scientists. Mayor Baker is anxious to convert Warrenville Farm into an agricultural school. President Thwing of the Western Reserve last January asked the trustees of Reserve

for funds to establish courses in forestry and agriculture, and these two facts may serve as a testing ground for the whole scheme. Students in the course of agriculture and forestry would direct the work of the agricultural school at Warrenville. Further application of the plan would bring into closer relations the city engineering departments and the college courses in mathematics and engineering. Instead of paying high salaries for experts, as is now done, plans and specifications for civic improvement could be drawn by students under the supervision of the city engineer. Students in chemistry courses could assist the water department in its investigations of the city water supply, the garbage department in the disposal of waste, and the health department in bettering sanitary conditions.

Seattle to Build \$500,000 Stadium.

Seattle, Wash.—A \$500,000 concrete stadium, with the floor six feet below the surface of Lake Washington, so that it could be flooded and used for aquatic events, will be built on the campus of the University of Washington, if plans now being formulated by the Seattle committee appointed to build a big playground carry. The city of Seattle is to build the amphitheatre at its own expense, and favors the University of Washington campus as the site. At present athletic facilities at the university are limited. Football, baseball and track are played on the old Denny Field, one of the poorest in the northwest.

New City Hall Nears Completion.

Carlisle, Ky.—The officials of the city of Carlisle and the fire department have moved into the new City Hall, which is nearing completion. The next regular meeting of the City Council will be held in the new building. Boulevard lights have been placed in front of the new building, which makes a most favorable appearance. The new hall cost about \$18,000. The old city building, having been sold, is being remodeled.

New Park for Washington.

Washington, D. C.—The first step toward beautifying the gateway to the nation's capital was taken when a board of appraisers made its preliminary inspection of the nine and one-half acres lying between the Union Station and the capitol grounds. It is planned to acquire the property and transform it into a great sweep of parking, studded with trees, flowers and fountains and stretching from the doors of the station up Capitol Hill to the entrance of the capitol itself.

Commissioner Submits Monthly Report.

Tacoma, Wash.—Commissioner of Public Works Owen Woods in his monthly report for September filed with the city clerk showed that he has \$1,225,005 worth of city contracts under way. This estimate does not cover the city's power and water projects which are under supervision of Commissioner Nicholas Lawson. The contracts uncompleted, according to the report compiled by Chief Clerk A. F. Metzger, are nine asphalt paving jobs, costing \$353,798; six grading jobs, costing \$48,561; one sanitary sewer contract for \$23,000; one planking and sidewalk contract for \$49,500; two vertical lift bridges, costing \$689,739, and numerous smaller grading and sidewalk contracts. This grand total of contracts under way October 1 is \$22,450 more than was under way September 1, despite the fact that \$35,581 worth of contracts were completed in September and accepted by Commissioner Woods. The difference is caused by the award of \$57,129 worth of new contracts last month. The report shows that 474 miles of streets were cleaned by the street department during September. Thirteen miles were cleaned by horse sweepers, 99 miles were washed with flushing machines and 362 miles were cleaned by cart men. The public works department did considerable work for other city departments during the month. A total of \$4,430 was done for the health department in street inspection and labor and \$2,500 in labor and material was contributed to the new contagious hospital. One thousand dollars' worth of labor and material was given to the municipal dock.

Spend Big Sum for Baths.

Cleveland, O.—The city of Cleveland spent \$31,104 in 1911 for the maintenance of public bath houses along the lake front. This was shown by the report of State Examiner C. S. Metcalf, filed with the state accounting bureau. The market receipts of the city for the year were \$35,555, just \$107 more than the operating expenses.

Concrete Work on State Road Started.

Gardiner, Me.—Placing of the concrete on the state road has commenced. Rock, sand and cement is placed in a hopper at the bottom of a pile of rock, and the hopper is hoisted to the revolving mixer of a steam mixing machine and emptied. After the material has been thoroughly mixed it is dumped into the carts, and hauled to various parts of the roadway. The work commenced at the Farmingdale line and will be continued along the causeway to the paving in depot square.

Pulmotor Placed at City Hall.

Everett, Wash.—Future cases of drowning, asphyxiation, electric shock, poisoning, or where firemen are overcome by smoke will be treated by the latest scientific device in Everett, for the Everett Gas Company has installed a pulmotor at an expense of \$250 and intends placing the life-giving apparatus in the city hall for general use. A demonstration of the pulmotor's possibilities was made before the police department in the city hall, for the police will have charge of this life-saving machine, and gas company employees and members of the fire department are to be trained in its use. Another demonstration, to which the public was invited, was recently held in the council chamber. In Chicago the pulmotor has revived 200 people out of 260 who were placed under its influence. Commissioner of Safety Brodeck will deputize the two police patrol drivers and two members of the fire department to take charge of the apparatus and become expert in its management so that they can use it in time of emergency.

Plan for Municipal Farm.

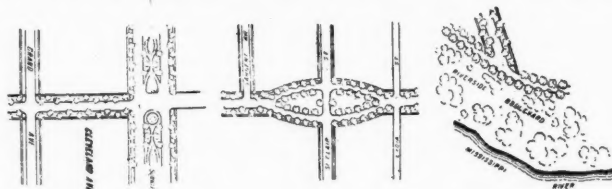
Pueblo, Colo.—A municipal farm for Pueblo may be a reality if Municipal Judge Crossman can have his way. As police judge, weighing the discrepancies of a mottly throng that appears before him daily, Judge Crossman has come to the conclusion that the present system of handling petty offenders is not a glorious success. Judge Crossman will shortly ask the city commissioners, the Commerce club, charitable organizations and women's societies to assist him in a movement to establish on land owned by the city and included in City Park, a modern municipal farm, patterned in many respects after the farm at Kansas City, which has proved not only self-supporting but a source of revenue. The land Judge Crossman would convert into a municipal farm is not used for park purposes. It is rented on shares each year by the commissioner of parks and brings the city some revenue. T. A. Duke, commissioner of parks, in discussing the matter said that the land and water was available and it would be a simple matter to convert the property into a municipal farm which would be the equal of any in the United States. "I have not studied the problem of municipal farms as a means of finding employment for petty offenders which would save the city the expense of maintaining them and enabling them to earn something for the city, but I am sure there is land and water now owned by the city which would enable the experiment to be made at very little cost. Judge Crossman's idea would be philanthropic. He would have the city arrange for prisoners to serve their time out on the municipal farm and to dispose of the crops or utilize hay and grain raised in the fire department. In this way instead of receiving half the products of the land as under the present arrangement of renting the land on shares, the city would have the entire crop, and the expense of growing the crop would be nothing, as the city must support the prisoners and at present the petty offenders are merely a burden and expense.

"I am not in favor of the idea purely because it is philanthropic," declared Judge Crossman. "I believe it would be the right sort of philanthropy. It would enable

petty offenders to serve their fines out under better conditions than at present, and their labor would be a source of profit to the city. As well as being philanthropic, I believe a municipal farm could be made to pay a substantial profit, and here we have the land and the water practically going to waste. I understand the city has two inches of water for City Park which is never used. Land on which to apply this water could be rented or leased, and thus the acreage increased. It is certain that irrigated land as close to Pueblo as City Park can be made to produce crops at a profit. I can see every reason for experimenting with a municipal farm and no good reason against it. I cannot help but think a few days in the country, or possibly a few weeks, working at farm work, eating wholesome food, living clean lives under good conditions, would have a greater tendency toward reformation of petty offenders than the same time spent in the cells at Pueblo's city jail."

Plans for Improving Boulevard.

St. Paul, Minn.—A suggested improvement from Summit avenue to the river, three sections of proposed plans for boulevarding Cleveland avenue, are shown in the maps.



At the left is shown the junction of the boulevard with Mississippi river. In the center is illustrated the plan as it would appear at St. Clair street. At the right is shown its terminus at Summit avenue.

Municipal Tree Scheme Planned.

Sacramento, Cal.—State Forester G. M. Homans has announced that his department will soon conduct an investigation on Municipal Tree Planting in Sacramento City, Marysville, Oroville and Chico, and later investigate conditions in Petaluma and Ukiah. These investigations are the first steps toward a campaign for the improvement in planting, selection, treatment and care of trees in municipalities and forms a part of a general scheme to bring about more general attention to trees in cities, towns and agricultural districts. The work in Superior California will begin in Sacramento, under B. Y. Morrison, of the University of California.

Will Open War on English Sparrows.

Fort Worth, Tex.—A war on English sparrows will be launched by the city park department, according to an announcement made by Park Superintendent Vinedge. Fort Worth and many other cities of Texas are afflicted with a veritable plague of English sparrows and other birds have been driven away by the sparrows. The park department has sent to the Department of Agriculture at Washington for information as to the most feasible means for exterminating them. "I believe that their presence here is a menace to the trees," the park superintendent said. "They have driven away the other birds that would have destroyed the worms and insects that have caused so many trees to die.

New Town Soon to Be Opened.

Freeport, Tex.—All arrangements are being perfected for the formal opening of the new town of Freeport, which will take place Nov. 20. An army of men is laying off the streets, building sidewalks and paving streets, and installing machinery for several great enterprises. One of the chief industries of the country is the sulphur mines located near the city, and an immense plant already has been installed to mine this. Arrangements are being made for a sugar refinery, and efforts are also being put forth to get another railroad. The country that surrounds the new town is productive, and the finest sugar cane, cotton, corn, rice and other farm products of the state are raised in this section of the country.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Liability for Injuries—Acts of Police.

Sehy v. Salt Lake City.—Where police officers of a city extended netting across a stream in an endeavor to recover the body of a drowned boy, the act was not in the discharge of any corporate power or function of the municipality, or on account of any municipal benefits, but in the discharge and in pursuance of a mere governmental duty, so that the city could not be held liable for the negligent and wrongful discharge of such duty, whereby a portion of the wire remained in the stream and caused an obstruction of the flow.—Supreme Court of Utah, 126 P. R., 691.

Officers—Policemen—Liabilities.

City of Lawton, et al., v. Harkins.—Policemen, as such, were unknown to the common law. They are creatures of statute, and can exercise only such power and authority as has been granted by legislative enactment; yet, the office being authorized by statute, the policeman is a conservator of the peace, and has the right to arrest violators of the laws, ordinances, and police regulations, without warrant, as provided by statute; but he is not exempt from civil liability when he acts in a wrongful, oppressive, and illegal manner, and the general doctrines of the law touching personal liability for torts apply to policemen.—Supreme Court of Oklahoma, 126 P. R., 727.

Ultra Vires Contracts.

State ex rel. Craig v. Town of Newport et al.—The council of a town having bought a lease of land for a water supply without the approval of the voters, necessary under Hill's Ann. St. & Codes, as amended by Laws 1901, to give it power, the town is not estopped to deny liability on the warrants issued therefor.—Supreme Court of Washington, 126 P. R., 637.

Indebtedness—Creation.

Diamond Power Specialty Co. v. City of West Point Georgia.—A contract of a city to purchase blowers for its electric plant, to be paid for, if satisfactory, after 30 days' trial, does not involve the creation of an indebtedness, but was a cash contract, though the city became indebted for the blowers by failure to pay at the agreed time.—Court of Appeals of Georgia, 75 S. E. R., 903.

Neglect of Governmental Duties—Civil Liability.

Harrington v. Town of Greenville.—Under the rule that, unless a right of action is given by statute, a municipal corporation is not liable to an individual for neglect to perform, or negligence in performing, a duty governmental in its nature, it is not liable for the burning of one's property through its failure to exercise its powers, under Revisal 1905, to abate nuisances and condemn buildings, or its negligent default in equipment and operation of fire department.—Supreme Court of North Carolina, 75 S. E. R., 849.

Constitutional Law—Creation of Port Districts.

Paine v. Port of Seattle, et al.—The enactment of laws providing for the creation of municipal and public corporations is within the inherent legislative power, and Laws 1911, authorizing the establishment of port districts, and providing for the development of a system of harbor improvements and terminal facilities, and the method of payment therefor, with defined powers to be exercised by a board of commissioners, is constitutional, there being no constitutional provision in terms prohibiting the creation of other municipal corporations than counties, cities, towns, and school districts, specifically recognized as municipal corporations; Constitution, which requires the Legislature to establish a system of county government, and

which declares that municipal corporations shall not be created by special laws, being only declarations of mandatory duty placed upon the Legislature's inherent powers, and the words "other municipal corporations," as used in the article, limiting the rate of indebtedness of counties, cities, towns, and school districts, and other municipal corporations, having reference to others than those specifically named.—Supreme Court of Washington, 126 P. R., 628

Injuries to Abutting Property—Damages.

Gaustad v. City of Enderlin.—A claim for damages, based on injuries to abutting property occasioned by and during the construction of a street grade on the street adjacent to said property, is not such a claim as is enumerated in sections 2703 and 2704, R. C. 1905; and on such a cause of action it is not necessary that the complaint show the filing with the city auditor of a claim for damages, with an abstract of the particulars thereof mentioned in those sections.—Supreme Court of North Dakota, 137 N. W. R., 613.

Bonds—Sinking Fund.

Parker v. City of Corbin.—Constitution, requiring provision to be made for a sinking fund to redeem municipal bonds, does not require a levy sufficient to retire the principal of the bonds, without regard to the increase of the fund from interest earned; and an ordinance providing for a sinking fund to pay bonds at maturity by the amount of a tax which, with interest, would produce enough to retire the bonds at maturity is valid.—Court of Appeals of Kentucky, 149 S. W. R., 970.

Defective Streets—Injuries—Liability.

Walls v. City of Detroit.—Comp. Laws, providing that, where any person sustains bodily injuries upon any street, etc., by neglect to keep it in a condition reasonably safe for travel by a city whose duty it is to keep the same in reasonable repair, the city shall be liable to the person injured for just damages, creates a liability against the city after it has actual or constructive notice of an obstruction placed in a highway by third persons.—Supreme Court of Michigan, 137 N. W. R., 532.

Street Railroads—Nature of Rights Acquired in Streets.

City of Detroit v. Detroit United Ry.—Upon the expiration of a franchise granted by a municipality to a street railroad company, the property in the public streets used in the maintenance and operation of the railway belongs to the company and may be removed by it, and it is entitled to notice to remove it within a reasonable time, and the municipality has no arbitrary power to proceed at once by force to effect such removal. A street railway company, by continuing to occupy the streets after the expiration of a franchise granted by the municipality, does not create a nuisance in the streets.—Supreme Court of Michigan, 137 N. W. R., 645.

Validity of Ordinance—Method of Passage.

Los Angeles Gas & Electric Corporation v. City of Los Angeles.—The charter of the city of Los Angeles provides that an ordinance shall not be effective before 30 days from the time of its final passage and its approval by the mayor, unless it be for the immediate preservation of the public peace, health, or safety, and contains a statement of its urgency and is passed by a two-thirds vote of the council. It also gives the right to a certain percentage of electors to file a referendum petition within 30 days. An ordinance submitting an ordinance providing for the imposition of a license tax on a large number of professions, trades, and callings, among them gas and electric companies, to the people for a referendum election, after a petition therefor, became effective within 30 days, but was passed by a vote of more than two-thirds of the city council, and contained the recital required by the charter. Held, the early submission to a vote of the license ordinance was of such immediate importance that the method of its passage would not invalidate it.—Supreme Court of California, 126 P. R., 594.

NEWS OF THE SOCIETIES

Calendar of Meetings.

- November 12-15.
AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS.—Annual Convention, Dallas, Tex.—A. Preccott Folwell, Secretary, 50 Union Square, New York.
- November 20-21.
SOUTHERN APPALACHIAN GOOD ROADS ASSOCIATION.—Fourth Annual Convention, Atlanta, Ga.—Cyrus Kehr, Vice-President, Knoxville, Tenn.
- November 19-22.
AMERICAN CIVIC ASSOCIATION.—Annual Convention, Baltimore, Md.—Richard B. Watrous, Secretary, Union Trust Building, Washington, D. C.
- December 3-6.
AMERICAN ROAD BUILDERS' ASSOCIATION.—Ninth Annual Convention, Music Hall, Cincinnati, O.—E. L. Powers, Secretary, 150 Nassau street, New York City.
- December 2-3.
AMERICAN SOCIETY OF REFRIGERATING ENGINEERS.—Annual Meeting, New York City.—W. H. Ross, Secretary, 154 Nassau St., New York City.
- December 2-5.
NATIONAL COMMERCIAL GAS ASSOCIATION.—Annual Meeting, Atlanta, Ga.—Louis Stotz, Secretary, 29 W 39th St., New York City.
- December 3-6.
AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Annual Meeting, New York City.—C. W. Rice, Secretary, 29 W. 39th St., New York City.
- December 4-6.
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS.—Annual Meeting, Detroit, Mich.—J. C. Olsen, Secretary, Polytechnic Institute, Brooklyn, N. Y.
- December 5-7.
NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION.—Annual Convention, Philadelphia, Pa.—C. A. Prosser, Secretary, 105 E. 22d St., New York City.
- December 9-12.
ASSOCIATION OF AMERICAN PORTLAND CEMENT MANUFACTURERS.—Annual Meeting, New York City.—Percy H. Wilson, Secretary, Land Title Building, Philadelphia, Pa.

League of Northwestern Municipalities.

Representatives of nearly every important city in the Northwest gathered for the first annual convention of the League at Walla Walla, Wash., Oct. 24-25.

The meeting was opened by Mayor A. J. Gillis of Walla Walla, who gave a brief history of the preliminary organization of the League, the selection of its officers, its object and aims. He welcomed the visitors to Walla Walla and expressed the hope that much good will result from the meeting.

Ex-Governor Miles C. Moore, president of the League, followed Mayor Gillis and joined the mayor in his words of welcome. He said in part: "It is a generally recognized fact that American cities are badly governed. Almost all the best governed cities in the world are on the other side of the water; almost all the worst governed cities in the world are in America, and the thing that is taxing our political genius is making a decent finish where we have made such a distinguished beginning. We should draw wisdom from the examples of those before us and avail ourselves of the crystallized experiences of the lawmakers from the earliest beginnings of government down to present times. Reference li-

braries embodying all that is best along the lines of municipal government should be established in some central city and made accessible to all interested. Briefly stated, this League is seeking to accomplish greater efficiency in municipal administration. We are trying to progress safely and sanely, preserving some degree of respect for that time-honored instrument, the Constitution of the United States."

The remainder of the morning session was taken up with discussions by Howard H. Hanson of Seattle and W. J. Locke of San Francisco. Mr. Locke, who is editor of "Pacific Municipalities," explained in detail the workings of the California Municipal League, while Mr. Hanson told of the work of the League of Washington Municipalities.

At the afternoon session the first discussion was by J. E. Frost, state commissioner of taxation, who spoke upon "Taxation and Finance." The remainder of the afternoon program consisted of a talk upon "Economy in Municipal Civil Service," by R. C. Erskine of Seattle, and a talk upon "The Municipal Reference Library," by Charles G. Haines.

In the evening E. F. Lawrence of Portland gave a stereopticon lecture upon "City Planning" in Whitman College chapel.

Discussion of the commission form of government and control of public utilities occupied much of the second day's session of the League. C. M. Fassett, one of the city commissioners of Spokane, opposed municipal ownership of public utilities, declaring that so long as employees are changed by elections, regardless of efficiency, a city is not prepared for public ownership and should be satisfied with control. Arthur Hodges, mayor of Boise, Idaho, lauded the commission form of government, but urged that the charters of cities be adjusted carefully to local conditions.

Declaring that in the regulation of the social evil this state is certainly behind the times, Mayor W. W. Seymour of Tacoma said that it was the universal conclusion wherever the problem had been studied that restriction does not restrict, and that it is not the solution. If restriction is wanted, he favored the Iowa law, providing for injunctions against disorderly places, confiscation of property and publicity of owners. Mayor Seymour spoke in favor of a better food and drug act, stating that "after morals, health should be considered." The pure food commissioner now has not enough authority, he declared. He recommended that the League work for the following: Conservative home rule for cities, regulating more effectively the social evil, more effective state food and drug act, permitting excess condemnation of property in first class cities, requiring boards of health to

pass on domestic water supply, a reformatory for women similar to that for men, and a court of domestic relations. He also favored mothers' pension act, compensation of convict workers, amendment to direct primary act disfranchising profligate men and women, and simplification of legal procedure.

A full and adequate public service commission law was advocated by C. M. Fassett of Spokane, in speaking on the subject, "Municipal Control of Public Utilities."

John P. Congdon of Boise, speaking of water supply, declared that the money spent by the average small city for expert advice, not only as to engineering problems, but also along chemical and biological lines, has almost always brought returns in added health, comfort and the satisfaction of their water supply.

Health is the greatest asset that an individual or a state can have, declared Dr. Crichton of Seattle. He stated that any community can reasonably protect itself from communicable diseases like scarlet fever and diphtheria and there is no reasonable excuse for these diseases. This much, however, cannot be said of tuberculosis, the necessary authority not having been given health officers to deal with it.

How North Yakima has cut down the number of typhoid fever cases from 124 in 1910 to 4 in 1912 was told by Dr. Tetreau, city health officer. It was done by proceeding in a business-like way, not on a 30-cent appropriation, he said.

"That city which is the most progressive and most enlightened is the one with the best paved streets," said George M. Hyland of Portland.

Regulation of all corporations by a single commission properly authorized by law and provided with facilities for giving due consideration to all the questions which affect corporations was the solution offered by William J. Hagenah of Chicago to the problem of public utilities.

The League adjourned after re-electing the present officers. President Miles C. Moore will appoint a legislative committee of 15, 5 from each of the three states, to try to secure laws wanted for the cities. Each state's committee will work in its own state.

New England Water Works Association.

The November meeting of this association will be held at Hotel Brunswick, Copley Square, Boston, Wednesday, Nov. 13, 1912. The following papers will be presented: "Some Difficulties Encountered in Tunnel and Subway Construction," illustrated, by Frederick I. Winslow, engineer of extension, Public Works Department, Water Service, Boston; "From Italy to the China Sea," illustrated, by Desmond FitzGerald, consulting engineer, Brookline, Mass. Topical discussion: "Paint for Standpipes and Methods of Applying."

Indiana Good Roads Association.

It was decided at a meeting October 11, at the Commercial Club, of a joint committee representing the various commercial and trade organizations of the city, that the convention in the interest of better roads in Indiana should be held at the German House, December 11, 12 and 13.

It is planned to bring to the city at that time exhibits that will be a feature of a convention of road machinery manufacturers, to be held at Cincinnati the first week in December.

To obtain the passage of laws on good roads legislation favored by the Indiana Good Roads Association will be the prime object of the convention, and it is believed that the convention will give impetus to any other legislation that looks to the betterment of the road laws of the state. One of the bills favored by the Indiana Good Roads Association will provide for a state highway commission.

Clarence A. Kenyon was elected chairman of the joint committee; Fred I. Willis, secretary; H. C. Atkins, treasurer, and Louis F. Smith, DeWitt V. Moore, John J. Madden, Clarence D. Boyd, D. M. Parry, W. S. Gilbreath and H. O. Smith, directors. These officers and directors will constitute the executive committee. A number of subcommittees will be selected.

Among those who will be invited to appoint delegates to the convention are mayors, township trustees, the Indiana State Bar Association, boards of county commissioners, commercial and trade organizations, farmers' institutes and schools and colleges. It is the plan to issue invitations to the Governors of states in the middle west and to others interested in good roads to attend the convention. It also is planned to invite each member of the legislature to be present.

The movement for the convention originated in the convention and publicity bureau of the Commercial Club.

Mr. Kenyon has written to J. E. Pennypacker, of Washington, secretary of the American Good Roads Congress, asking if the convention may have, as one of its features, the model good roads exhibit shown in connection with the meeting of the congress at Atlantic City recently. He also has written to the National Old Trails Roads Association asking for co-operation for the convention.

American Automobile Association.

Two days after the inauguration of the next President of the United States the second federal aid good roads convention, under the auspices of the American Automobile Association, will be held at Washington, D. C., the dates being March 6 and 7, 1913. The success of the initial federal aid gathering in Washington in January last was so pronounced that the A. A. A. National Good Roads Board decided to make it an annual feature until federal aid shall have become a substan-

tial accomplished fact through congressional action. If results follow future conventions as rapidly as they did the first one, it should be a matter of only a few years before a comprehensive system of national highways constructed by federal appropriation is in existence.

The assembly in Washington last winter, attended by delegates from two-thirds of the states, was the first convention devoted to the subject of federal aid in highway construction. The action taken memorialized the Congress for the appointment of a joint committee of Senate and House to investigate the subject of federal aid and formulate a program for national participation. The joint resolution that resulted had the approval of Representative Underwood, who appeared before the rules committee in its support. Its adoption practically in its original form by Congress was a step the full worth of which has yet to be thoroughly appreciated.

The joint committee appointment under this resolution consists of Senators Jonathan Bourne, of Oregon; Boies Penrose, of Pennsylvania; A. J. Gronna, of North Dakota; Lee S. Overman, of North Carolina, and Claude A. Swanson, of Virginia; and Representative D. W. Shackelford, of Missouri; Gordon Lee, of Georgia; Daniel J. McGillicuddy, of Maine; Martin B. Madden, of Illinois, and Richard W. Austin, of Tennessee. This committee is now collecting information on the subject and preparing to report at the coming session of Congress.

Its appropriation of \$25,000, however, is hardly sufficient for a thorough study of the subject, and it is anticipated that further appropriations for this purpose must be made before any scheme of national highways can be intelligently adopted. Incidental to laying the ground-work for large scale participation by the federal government, the present Congress also appropriated \$500,000 for use by the department of agriculture and postoffice department in the experimental improvement of rural free delivery highway routes.

Southern Appalachian Good Roads Association.

The fourth annual convention of the association will be held in Atlanta, November 20 to 21. During the same week, from November 16 to 23, inclusive, an automobile show will be held in the city auditorium and Taft Hall. Through this combination of the Southern Appalachian Good Roads Association and the automobile show it is believed that a large number of good roads enthusiasts will be brought together and that much will be accomplished for the good roads cause in the section embraced within the scope of this organization.

Since the organization of the Southern Appalachian Good Roads Association at Asheville in 1909 the good roads cause in this wonderful section

of our country has gone forward in leaps and bounds, as evidenced by the great number of interstate highways now being constructed. The states included in this association are West Virginia, Kentucky, Virginia, North Carolina, Tennessee, South Carolina and Georgia, and it is expected that each of these states will be represented by good delegations. Arrangements are being made for a most interesting and attractive program, which will be announced later.

Good roads will be discussed not only in a general way, but experts will take up technical questions, which will undoubtedly be of great benefit to all delegates who have to do with the administration and construction of public roads. Discussions are invited at all times and the delegates are urged to ask specific questions in regard to any points they wish brought out. Among the many questions which will thus be discussed and possibly new light thrown on are those relating to location, grading, drainage, surfacing materials, culverts, dust preventives, tar and asphalt macadam, use of convicts in public road construction, state aid to counties, use of wide tires, uniform county road legislation, road engineering, etc.

Invitations will be extended to the governors of the seven states to make addresses, and members of congress who are especially interested in the promotion of good roads. It is expected that the United States office of public roads will have a representative present, and the highway department of Virginia, the various colleges and universities which have courses in road engineering, the state geologists of the various states, etc. In addition to the above there will be a number of representatives of county and local road associations, each of whom will bring his message of concrete import. There will also be representatives from the various interstate highways now being built, who, in short talks, will tell of the progress of the work along the highway he represents. The American Automobile Association will also be represented.

PERSONALS

Janssen, John T., Milwaukee, Wis., recently celebrated his twenty-fourth anniversary as head of the Milwaukee Police Department. He has been in police work more than thirty-five years, having joined the department April 25, 1877.

Scharff, John N., Donaldsonville, La., has been elected chief of the Fire Department.

Dieker, Henry, Perth Amboy, N. J., has been promoted to the position of chief engineer of Perth Amboy's water works.

Taylor, John H., Paterson, N. J., captain of the Paterson Police Department, has resigned after twenty-eight years of service with the Police Department.

MUNICIPAL APPLIANCES

Panels for Series Incandescent Circuits.

For the control of General Electric series incandescent systems, as for street lighting systems, small panels mounted on pipe supports for installations immediately in front of the transformer are generally used, as they provide a compact, simple and inexpensive arrangement for transformer control. The high tension leads are somewhat shortened by the use of these panels since it is unnecessary to run them from the transformer to the main switchboard. The standard panels are made of polished blue Vermont marble $1\frac{1}{2}$ inches thick, mounted on two pipe supports 64 inches long and are braced from the floor by pipes which are furnished with the panel. At the end of the pipe braces are pivoted flanges so they may be braced from the wall instead of the floor, if desired.

Each panel is equipped with two primary plug switches unless the primary voltage exceeds 2,500 volts, in which case a special panel equipped with oil switches must be furnished. These plug switches are capable of carrying 100 amperes continuously without undue heating. This type of switch when used on these isolated panels has the tube fuse clips attached.

The duties of the plug tube switches in the secondary side of the transformer are somewhat different from those in the primary side, and while they are obliged to stand in some cases 8,500 volts, the current carrying capacity is comparatively very small. For this reason they are made of brass and are well insulated from the panel, making it unnecessary to depend on the insulating qualities of the marble.

Secondary plug switches comprise open circuiting plug switches and short circuiting plug switches.

Open circuiting plug switches are provided on all panels and are used to disconnect the line from the secondary of the transformer when testing for ground or open circuit. They also answer the purpose of disconnecting one of the circuits of a multi-circuit transformer for repair without interrupting the other circuit.

Short circuiting plug switches are only included in the equipment of multi-circuit transformer panels, and serve the purpose of connecting both secondary coils in series on one lamp circuit when desired.

All of the primaries of constant current transformers are provided with fuses to protect the windings of the transformers. These fuses are made part of the primary switch and are mounted on the back of the panel. They are of the tube expulsion type and are very effective.

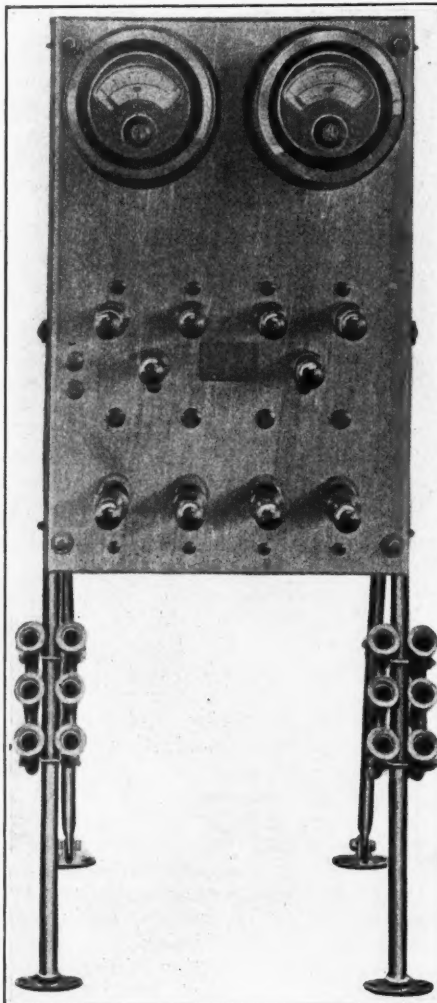
Plug racks for the reception of plugs when not in use are provided with all panels. These racks are shown at-

tached to the panels in the various illustrations.

One Type R-2 round pattern ammeter is furnished for each transformer controlled and is permanently connected in the secondary circuit.

The Type R instruments are particularly adapted to this service as they are small, of neat appearance, accurate and substantial. They are practically dead beat, but will respond to a minute change in current value. Furthermore, they are free from frequency, wave form and heating errors, and are shielded from external magnetic influences as the entire electrical portions are completely surrounded by a laminated iron shield.

Five or ten ampere instruments are furnished, depending upon the ampere capacity of the lamps, and in each case the ammeters are provided with markers which may be set at the requisite current value. With the markers properly set any deviation of the current may be readily detected. The scale is very open in the center, permitting the instruments to be read with great precision. When the voltage exceeds 2,300 volts, an insulating cover is provided for this ammeter.



SMALL PANEL FOR STREET LIGHTING SYSTEM.

The Thomson high torque induction meter IS-2 is standard for this class of panels. This meter is made back connected and is mounted on the front of the sub-base. It is provided with a metal case, finished to correspond with other instruments on the panel. The Type IS-2 meter is designed with particular reference to switchboard requirements, and not only does it possess high initial accuracy under the most adverse conditions, but because of its high torque it will retain this accuracy over long periods of service.

Being small and compact, it adds to the appearance of the board.

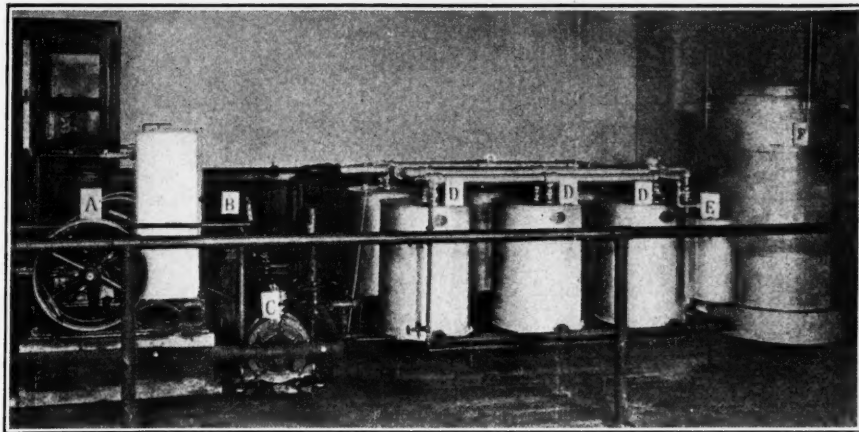
The proper selection and installation of the lightning arrester equipment is an important feature of any series incandescent installation. As many central stations suffer enormous losses each year resulting from lightning, horn type arresters, with series resistances, are recommended for the protection of the series circuits. Lightning circuits are usually confined to city limits, consequently the principal sources of trouble are not the high frequency disturbances but low frequency surges set up by sudden opening of the loaded circuits. These disturbances are specially severe when circuits are accidentally grounded due to contact of the wires where they pass through the tops of trees or become crossed with other circuits.

The horn type arrester is most satisfactory for this service, as the surge set up by the sudden opening of the circuit is dissipated by the arrester before the arc is interrupted. The arc usually lasts for several cycles, as the operation of the arrester depends upon the lengthening of the arc, limited by the series resistance. The resistance aids the horns in extinguishing the arc, limits the size of the arc and prevents short circuits occurring during the period of discharge.

It is recommended that these arresters be installed in the station on each outgoing line and that particular attention be given to connections, especially those to ground.

Air-o-lite Gas.

The Air-o-lite Gas Company, Thomson Building, Cincinnati, O., are the patentees and owners of a system of manufacturing and distributing gas which is suitable for a public supply for villages, small towns and for other purposes. Low cost of installation is claimed as a special merit of the system—no expensive machinery, retorts, furnaces, large tanks or other complicated apparatus and no special location are required. The gas is formed by the passage of air through a fluid which is prepared and furnished by the company. The gas is said to be free from moisture, does not condense under the conditions to which it is subjected and has a heating value of 1,200 B. T. U. per cubic foot. The fact that it is generated without heat, dust or great expenditure of mechanical energy adapt it for use in high class residential districts. The gen-



GAS PLANT FOR SMALL TOWN.

eration of gas is automatically controlled by the consumption. The usual appliances of a distribution system—pipes, fittings, meters, etc.—are used. Danger from leaks is minimized by the fact that the gas does not settle to low points like gasoline vapor. The purity of the gas is said to give long life to mantles. The illustration shows the construction of the generating plant.

J.-M. Fibre Conduit.

The J.-M. Fibre Conduit is made by the H. W. Johns-Manville Co. It is formed from fibre or wood pulp under hydraulic pressure. The wood pulp is thoroughly saturated with a bituminous compound and any vegetable matter or bacteria which would tend to promote decay is killed by the presence of a small amount of creosote salts. The material is practically indestructible from natural causes or when subjected to high temperatures. The conduit is impervious to moisture, gases, acids or other corrosive elements. Thus water, gas and stray currents tending to produce electrolysis cannot reach the cable protected by these conduits. The insulating efficiency is high. The standard $\frac{1}{4}$ -inch thickness of wall indicates an average puncture voltage of 32,600 volts dry and 24,500 volts after 40 hours immersion in water. On account of tight joints and smooth bore preventing abrasions when the cable is pulled through cable troubles are eliminated. The tightness of the conduit makes it easy to lay, besides saving cartage and freight. Loss from breakage in transit is nil. The conduit is included in the list of materials which have received the approval of the Underwriters' Laboratories after examination under the provisions of the National Electric Code for central station work and when laid in concrete.

In order to meet the conditions of service four types of joints are furnished—socket, drive, screw and sleeve.

The socket joint type is recommended where concrete is used as a support. The socket or mortise and tenon connections are automatically cut and turned, being $\frac{3}{8}$ or $\frac{1}{2}$ inch long (depending on size), slightly tapering

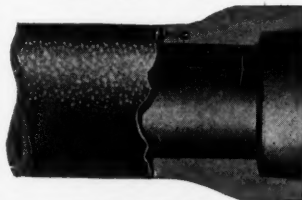
and uniform in size, insuring perfect fit and alignment when laying.

Sleeve, drive and screw joints are recommended where the conditions prevent the use of concrete as a protecting medium. These types are particularly recommended for running through parkways and other places where there is little probability of future disturbance.

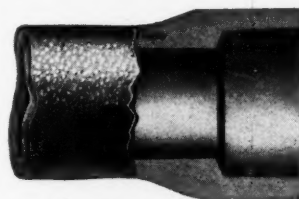
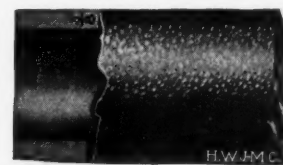
In the sleeve and drive types the ends of the pipe are squared and faced, then turned down to fit snugly into the sleeve so as to make a tight connection.

The screw type is somewhat similar to the sleeve construction with slightly thicker walls than the socket type, in order to carry the threads that are cut in the ends of the pipe. Special threads, four to the inch, are used and a coupling is provided for completing the joint. The joints are screwed by hand and a compound is wiped on the threads when making the connection which hardens and renders the joint watertight.

J.-M. Fibre Conduits are made in two styles, Style J having bell joints and Style M having straight joints. The illustrations are all of the Style J. All Style J conduits have not less than $\frac{3}{8}$ -inch walls, which insures greater mechanical strength than is obtained with Style M straight joint conduits. This material is recommended for electrical cables laid in concrete, in tunnels, or elsewhere, where the most permanent and serviceable type of conduit is desired. Moulding is the only construction that permits of a bell-shaped joint; and it is only with a bell joint that the walls of each section can be as thick and as strong in the joint as at any other point. For this reason the bell joint conduit can be laid without the protection of concrete. The joints are practically air-tight.



J.-M. STYLE J SOCKET BELL JOINT CONDUIT.



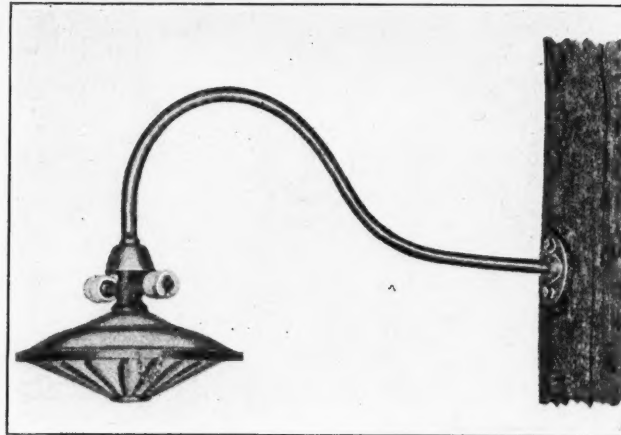
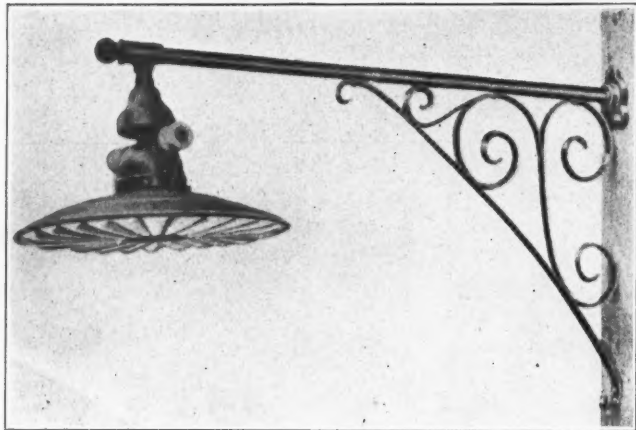
J.-M. STYLE J SLEEVE BELL JOINT CONDUIT.

Loper Fire Alarm Devices.

The Loper Fire Alarm Company, Stonington, Conn., manufacture a line of fire alarm devices of high grade design, materials and workmanship. All of their signal boxes of the several grades are alike in their construction. They consist of three boxes, one within the other, and each insulated from the other. The inner round bronze box contains the clockwork, has a glass front, and is protected by the two other boxes, ensuring almost absolute safety from ground connection, and thoroughly protecting the clockwork. The break-circuit wheels are always of insulated material, with platinum contact points for the fingers. The second box contains the clockwork box, the lightning arrester, and all the other devices used in the box, mounted on slate, and has a lock, the key of which is in charge of the proper officer. Through the door the hook projects for the pulling-in the alarm. The hook is accessible to the ordinary citizen, and the instructions, "Pull the hook, and let go," are plainly cast upon the door. The outer box is the ordinary street box, properly numbered, with lock and key. Trap locks furnished if desired, and key guards. Also keyless doors. All the boxes are made as above and finished in different grades, as follows:

Improved Successive Non-Interference Box.—This box is so arranged that the pulling-in of any other box throws the sending device out of gear after starting the box, but when the other boxes have completed their signals, this box will send its signal. It cannot be pulled-in while another box is running to confuse the signals. It also contains a test bell, test switch, signal key, lightning arrester, telephone attachment, etc., making it the most complete box yet introduced.

Non-Interference Pull Box.—This box is so arranged that when the hook is pulled down it disconnects itself from the box mechanism, and is automatically connected on the last round. The mechanism cannot be disturbed during its running by pulling on the hook and can be pulled again only at the end of its regular number of rounds. This box also contains the



INCADESCENT STREET LIGHTING FIXTURES MADE BY THE TEA TRAY COMPANY.

test bell, test switch, signal key, lightning arrester, etc., the same as above.

The Village Box.—This box is smaller in size than the above. It has the non-interference pull, also lightning arrester, break-circuit key, and plug switch, which, with a small portable bell furnished, can be electrically and mechanically tested without ringing the outside bells and gongs. This box contains every essential for a first-class box, and is specially adapted for towns that wish a perfect yet simple box.

Plain Village Box.—This box is the same as the Village box, except it has a plain, instead of a non-interference pull. Each box is protected by a cut-out, absolutely preventing injury by dynamo or other heavy currents.

The clockwork for giving the signals is of the same size and workmanship in all the above boxes, there being no difference except in the number of devices. A perfect operation is warranted in the Village as in the large box; and the clockwork is made with the greatest care, and is first-class in strength, durability and workmanship.

Among the other Loper devices are the following:

A whistle blowing machine and tower bell striker. This may be attached either to a steam or air plant and will operate on any make of fire alarm. The machine is regulated by fans. A short or long blast may be blown. The box number is blown with regularity, each blast being clear and distinct.

A tower bell striker, built in three sizes, for bells up to 10,000 pounds in weight.

Compressed air apparatus. This is automatic, operated by electric current from a storage battery or otherwise. A pressure of 130 pounds is always maintained in the reservoir.

Switch boards of neat and simple designs.

Punch register, which records every signal sent and may be arranged to stamp the time, day, hour and minute on a tape, in addition to the box number.

Gongs and master boxes.

For a small town requiring an inexpensive alarm system the Loper Company advises that a master box be located in the telephone exchange. Either a whistle or a church bell may be used for sounding the alarm. The master box is equipped with signal wheels, each wheel having a number to correspond with a certain section of the town. When a fire is discovered, the information is telephoned to central, who puts on the proper wheel for the district and pulls the hook. The number is sounded on the whistle or bell.

Incandescent Street Fixtures.

The Tea Tray Company, Newark, N. J., manufacture a line of incandescent street lighting fixtures. These include brackets, enamelled hoods, malleable iron crossarms, mica and porcelain insulators.

The first illustration shows an 18-inch black enameled hood, white porcelain enameled fluted deflector, malleable iron canopy crossarm, high tension mica insulating joint, 3/4-inch straight bracket four feet long, with pole flange and wrought-iron scroll. All metal parts are heavily enameled.



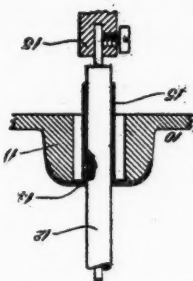
LOPER FIRE ALARM BOXES.

The other illustration is a 14-inch copper hood with white porcelain enameled fluted steel deflector, malleable iron crossarm, mica insulating joint, 3/4-inch goose neck bracket three feet long, oval pole flange. All iron parts are heavily enameled.

PATENT CLAIMS

1,041,728. MEANS FOR PREVENTING THEFT OF CURRENT FROM ELECTRIC METERS. Charles F. Bertig, Winsted, Conn. Serial No. 682,887.

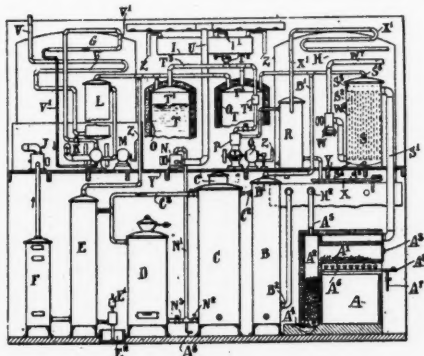
The combination of a wire, a disk through which the wire extends, said disk having a



tube connected therewith and inclosing and rigidly secured to the wire, said disk constituting a barrier for an opening through which said wire extends.

1,041,810. METHOD AND MEANS FOR UTILIZING FUEL WASTES AND GENERATING POWER. Joseph Moses Ward Kitchen, East Orange, N. J. Original application filed April 3, 1909, Serial No. 487,694. Divided and this application filed June 28, 1909. Serial No. 504,778.

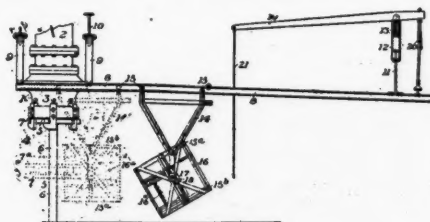
The method herein described for utilizing fuel wastes and generating power, which consists in, (1) distilling fuel and producing



the separate products, coal gas, coke and exhaust hot gases, (2) generating producer gas from the coke product is a step separate and apart from the step of distilling the fuel, (3) generating motive energy from the producer gas, (4) generating motive energy from the exhaust hot gases, and (5) uniting the two motive energies.

1,042,307. APPARATUS FOR HANDLING CLAY PIPES. Edwin Babb, Akron, Ohio. Serial No. 420,884.

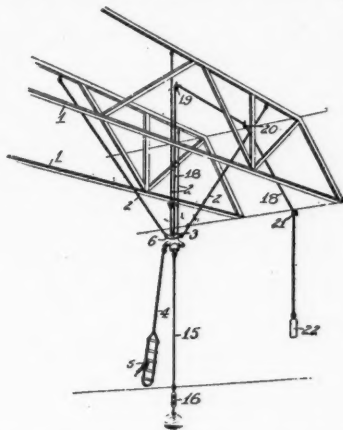
An apparatus for handling clay pipes, comprising an invertible cradle adapted to be moved to and from the pipe forming machine, fixed supports at one end of the cradle for the reception of a socket plate having a pipe



thereon, said cradle and support being arranged to be moved in a lateral direction over the socket plate, and fixed guides at the other end of the cradle for receiving and holding a laterally sliding bat-board in position to support the pipe when the cradle is turned; substantially as described.

1,042,271. GIANT-STRIDE. Milton B. Reach, Chicopee, Mass., assignor to A. G. Spalding & Bros. Man'g Co., a Corporation of Massachusetts. Serial No. 691,009.

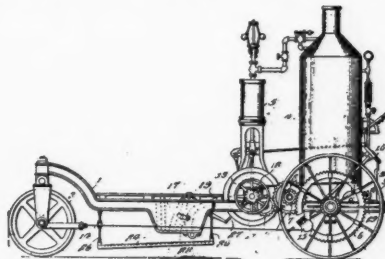
In a giant-stride apparatus, a head having a rotary member, guy ropes extending up-



wardly and outwardly from the head at an angle, and a central straining rope depending from the head and attached to the floor, substantially as described.

1,042,230. COMBINED TRACTION STONE-CRUSHER AND ROAD-ROLLER. Elmer Hubbard, Gilboa, N. Y. Serial No. 670,986.

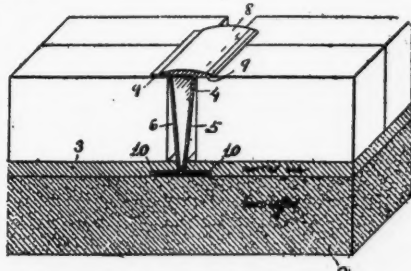
A combined road roller, stone crusher and separator comprising a main frame, rotary supports therefor having a broad tread and constituting the road rolling means, a stone crusher carried by the main frame, a separator for the crushed stone supported by the main frame in position to receive the stone



from the crusher, an engine mounted upon the main frame, and connecting means between the engine and the stone crusher, separator and rolling supports, whereby the machine may be simultaneously propelled over the road to apply crushed stone to the surface thereof and to roll the stone into the surface of the road.

1,040,731. PAVING-JOINT. Thomas L. Moore, New York, N. Y. Serial No. 672,871.

A spring metal paving joint consisting of opposite movable angularly related flanges, separated from each other by a V-form interval, upper outward extending shoulders, and a cover for said interval, having connection with one of said flanges to move therewith.



1,041,947. MIXING-MACHINE. Frederick T. Arnold, U. S. Army. Serial No. 656,590.

A mixing machine comprising an axle, an octahedral hopper upon the axle, wheels upon the axle, means carried by the hopper and one wheel for causing the hopper to rotate with the wheels to mix the contents of said hopper, opposed baffle plates upon the inner faces of the sides of the hopper and positioned obliquely to the axle, and twisted blades of various lengths projecting from the axle to assist in mixing material within the hopper during rotation of the latter.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago. No large contracts have been placed lately and business consists of small orders. Prices are firm. Quotations: 4-inch, \$30; 6 to 12-inch, \$28; 16-inch and up, \$27. Birmingham. Shipments are impeded by lack of cars, but stocks have not begun to accumulate. All shops are busy. Quotations: 4-inch, \$25; 6-inch and up, \$23. New York. Private buying keeps up in surprising volume for the season, some of it being for next year's delivery. No public lettings of importance are announced for this vicinity. Quotations: 6-inch, carloads, \$24.50 to \$25.

Lead.—Market is dull and easy. Quotations: New York, 5c.; St. Louis, 4.85c.

Alternating and Direct Current Switchboard Panels.—The General Electric Company has designed and standardized switchboard panels which long experience and accurate knowledge of requirements have demonstrated will successfully meet the demands for which they are intended, and has just issued two bulletins: one illustrating and describing Alternating Current Switchboard Panels for Three-Phase, Three-Wire Circuits, of 240, 480 and 600 Volts, 25 to 60 Cycles, and the other describing Direct Current Switchboards, Double Polarity, 125, 250 and 600 Volts. These bulletins are numbered 4996 and 4995, respectively.

Motor Fire Apparatus.—The Webb Company, Allentown, Pa., builders of motor fire apparatus, announce the opening in Chicago of a branch sales office.

This office will be under the direct supervision of Mr. O. S. Doolittle, and is located at 1000 Michigan avenue. Mr. Doolittle will direct the sales over central and western United States for the Webb company from this office.

Rolland Carr, general manager of the Webb company, Allentown, Pa., is in St. Louis this week, making final arrangements for the closing of the old Webb motor fire apparatus plant at that point. The new factory of the Webb company is now complete, and orders are being filled rapidly.

Shipments were made from the St. Louis plant of the Webb company last week as follows: Combination chemical and hose wagon, North Vancouver, B. C.; triple combination, Caldwell, Idaho; combination chemical and hose wagon, Lethbridge, Can.; aerial hook and ladder truck, Medicine Hat, Can.

Tractors.—The Ohio Tractor Mfg. Company, of Marion, Ohio, builders of a ten-ton, two-cylinder, 30 h. p. kerosene tractor with crowning wheels, 6 feet 6 inches in width, being their 1913 style, five of which are now on the market and giving the best of satisfaction, recently contracted for forty of their machines, to be ready for next season's market.

THE WEEK'S CONTRACT NEWS

Relating to Municipal and Public Work—Street Improvements—Paving, Road Making, Cleaning and Sprinkling—Sewerage, Water Supply and Public Lighting—Fire Equipment and Supplies—Bridges and Concrete Work—Sanitation, Garbage and Waste Disposal—Police, Parks and Miscellaneous—Proposals and Awards.

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
Illinois	Lawrenceville	Nov. 9, 9 a.m.	Constrn. state road	Town Clerk.
California	Los Angeles	Nov. 11, 2 p.m.	Imp. road	Co. Supervisors.
Pennsylvania	Wilkes-Barre	Nov. 11, noon	Repaving with asphalt or brick	Evan Challis, Joint Chrmn.
New Jersey	Camden	Nov. 11, 11 a.m.	Imp. 3 roads	John Prentice, Dir. Freeholders.
Arizona	Phoenix	Nov. 11, 5 p.m.	Constrn. bitulithic pavements	V. A. Thompson, Supt. Sts. County Comrs.
Washington	Stevenson	Nov. 11 (re-ad.)	Constrn. 1 mile road	D. C. Smith, Sec.
Texas	Houston	Nov. 11, noon	Constrn. creosoted wood and bit. pave.	G. C. Scales, Co. Engr.
Alabama	Marion	Nov. 11	Grading 4 miles road, cost \$8,000	H. M. Chaney, Co. Aud.
Ohio	London	Nov. 11, noon	Constrn. gravel road	W. T. Patten, Co. Aud.
Indiana	Indianapolis	Nov. 12, 10 a.m.	Constrn. gravel roads	State Roads Com.
Maryland	Baltimore	Nov. 12	Constrn. 4 1/4 miles highways	P. St. J. Wilson, St. Hwy Comr.
Virginia	Richmond	Nov. 12, noon	Constrn. 83 miles gravel or soil roads	J. B. Harrington, Clerk Comrs.
Maryland	Easton	Nov. 12, noon	Constrn. 1.06 miles highway	J. H. McConnell, Co. Aud.
Ohio	Canton	Nov. 13, 10 a.m.	Imp. 2 streets	J. M. Corliss, Dir. Freeholders.
New Jersey	Freehold	Nov. 13, 11 a.m.	Constrn. gravel road	C. B. Stover, Pres.
New York	Brooklyn	Nov. 14, 3 p.m.	Constrn. gravel walks, &c.	F. A. Hausheer, Auditor.
Indiana	Laporte	Nov. 14, 10 a.m.	Constrn. 2,400 lin. ft. macadam	Mayor.
New Jersey	Roselle Park	Nov. 15, 8 p.m.	Constrn. 14,000 yds. bituminous pavement.	Co. Supervisors.
California	Fresno	Nov. 15	Constrn. oil macadam, cost \$9,000	C. J. Steiss, Sec. Park Comrs.
Indiana	Fort Wayne	Nov. 15	Constrn. cement s'walks, plant. trees, &c.	W. B. Green, Co. Judge.
Texas	Gonzales	Nov. 15, 3 p.m.	Constrn. 75 miles gravel or clay roads	J. R. Marker, St. Hwy Comr.
Ohio	Columbus	Nov. 15, 10 a.m.	Constrn. 1.09 miles macad. in Bloom Twp.	J. R. Marker, St. Hwy Comr.
Ohio	Columbus	Nov. 15, 10 a.m.	Constrn. 1 mile brick in Perry Twp.	J. C. McArthur, Capt. Q. M.
New York	Fort Slocum	Nov. 16, 10 a.m.	Constrn. roads, walks and gutters	E. W. Robinson, City Engr.
Missouri	Webb City	Nov. 18	Constrn. 2,000 ft. cement curb & gutter.	H. V. Long, Ch. Freeholders.
Ohio	Springfield	Nov. 18	Constrn. roads	E. M. Bigelow, St. Hwy Comr.
Pennsylvania	Harrisburg	Nov. 19, 10 a.m.	Constrn. 4,500 lin. ft. brick paving	H. H. Canfield, Clerk.
Ohio	Cleveland	Nov. 19, noon	Improving road and constrn. sidewalks	E. M. Biglow, Comr.
Pennsylvania	Harrisburg	Nov. 19	Constrn. 4,600 ft. brick pavement	J. W. Seaman, City Engr.
New Jersey	Long Branch	Nov. 20, 10 a.m.	Constrn. concrete and brick gutters	J. F. Goldenbogen, Clk. Co. Bd.
Ohio	Cleveland	Nov. 20, 11 a.m.	Improving road	F. W. Fagel, Co. Aud.
Indiana	Shelbyville	Nov. 21	Constrn. 5,800 yds. gravel	A. W. Muirhead, Dir.
New Jersey	Flemington	Nov. 21, 11 a.m.	Imp. roads	S. Struble, Pres. Comrs.
Ohio	Cincinnati	Nov. 22, noon	Constrn. culvert and macadamizing road	Co. Comrs.
Kansas	Topeka	Nov. 22	Constrn. 2 brk. & one concrete pavement	H. R. Stanford, Chief Clerk,
New York	New York	Nov. 23, 11 a.m.	Constrn. granite block paving	Washington, D. C.
Texas	Houston	Nov. 25, noon	Paving McGowen ave.	H. B. Rice, Mayor.
Nebraska	Grand Island	Nov. 25, noon	Constrn. 2 1/2 miles road	H. W. Kibbey, Co. Engr.
Florida	Ocala	Dec. 3	Constrn. brick pavements	J. D. Robertson, Mayor.
Kentucky	Pikeville	Dec. 9	Constrn. 25,000 yds. paving	Stoney Amick, City Engr.
Florida	Fernandina	Dec. 18, 3 p.m.	Furn. material for 11,000 sq. yds. brick pavement	G. L. Baltvell, City Clerk.
SEWERAGE				
New York	Syracuse	Nov. 11	Constrn. 48-in. sewer	Sewerage Board.
Texas	Houston	Nov. 11, noon	Constrn. 28,000 ft. of 8 to 42-in. pipe sewer.	D. C. Smith, City Sec.
New Jersey	Newark	Nov. 12, 2 p.m.	Constrn. Section 10 Passaic Valley sewer.	J. S. Gibson, Clerk Comr.
Texas	Waco	Nov. 12, 10 a.m.	Constrn. concrete storm sewers	J. B. Mackey, Mayor.
Ohio	Toledo	Nov. 12, noon	Constrn. a number of sewers	F. G. Stockton, Secy.
Ohio	Akron	Nov. 12, noon	Constrn. sewers in number of streets	R. M. Pillmore, Dir. Pub. Serv.
Ohio	Columbus	Nov. 12, noon	Constrn. sewer	S. A. Kinnear, Dir. Pub. Ser.
New York	Brooklyn	Nov. 13, 11 a.m.	Constrn. number sewers	A. E. Steers, Boro. Pres.
Texas	San Benito	Nov. 13, 8 p.m.	Constrn. 34,000 ft. 8 to 18-in. pipe sewers, two disposal plants	Brice Frazier, City Clerk.
Mexico	Laredo	Nov. 14	Constrn. 3,300 ft. sewer pipe and 59,000 ft. c-l. water pipe, tanks, &c.	M. Rodriguez, Mayor.
Ohio	Newburg Heights	Nov. 14, noon	Constrn. sewers in two streets	C. E. Goodsmith, Vil. Clerk.
Illinois	Petersburg	Nov. 18, 8 p.m.	Constrn. sewer system	H. M. Levering, Mayor.
Alabama	Florence	Nov. 18, 7:30 p.m.	Constrn. storm water sewer	J. B. White, City Clerk.
Texas	San Benito	Nov. 18, 8 p.m.	Constrn. about 3,300 ft. 8 to 18-in. pipe & two disposal plants	J. M. Breen, Mayor.
Wisconsin	La Crosse	Nov. 20	Constrn. pumping station, 5 sub-stations, disposal plant, two reservoirs	Bd. Pub. Wks.
Florida	Live Oak	Nov. 21	Constrn. sewer system	W. H. Lyle, Chrmn. Trustees.
Ohio	Newburg Heights	Nov. 23	Constrn. sewer and water main	H. W. Shimek, Clk. Bd. Control.
Texas	Houston	Nov. 25	Constrn. 37,000 ft. 8 to 24-in. pipe sewer.	H. B. Rice, Mayor.
Iowa	Lyon	Nov. 29	Constrn. 2 1/2 miles 8 to 24-in. clay pipe	J. D. Thorn, City Engr.
Florida	W. Palm Beach	Dec. 3 (re-ad.)	Con. 22,000 ft. conc. pipe & septic tank	A. M. Lopez, Clerk.
Iowa	Tipton	Jan. 15	Constrn. sewers	P. D. Ketelsen, City Clerk.
WATER SUPPLY				
New York	Buffalo	Nov. 9, 11 a.m.	Constrn. water system in hospital bldg.	F. G. Ward, Comr.
Texas	Waco	Nov. 11	Constrn. 6,000,000-gal. filtration plant	City Clerk.
Arkansas	Magnolia	Nov. 11	Furn. material for water works system	Water Works Comrs.
Canada	Dunnville	Nov. 11, 9 p.m.	Constrn. 125,000,000-gal. tank	A. M. Jackson, Supt.
Ohio	Lakewood	Nov. 11, noon	Constrn. mains, &c., in several streets	J. W. Chisford, Dir. Pub. Ser.
Ohio	Youngstown	Nov. 12	Furn. pump	W. H. McMillin.
Ohio	Toledo	Nov. 12, noon	Constrn. pumping station, including 2 rotary pumps, 7,500 gals. per minute each with motors, etc.	J. R. Cowell, Dir. Pub. Serv.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
New York	New York	Nov. 13, 2 p.m.	Furn. Venturi tubes with recording apparatus, &c.	H. S. Thompson, Comr.
Minnesota	Duluth	Nov. 14, 4 p.m.	Constrn. 100,000 gal. steel tank	S. R. Hatch, Acting Mayor.
Illinois	Fairfield	Nov. 15	Constrn. water works	Mayor Harlan.
Manitoba	Winnipeg	Nov. 15	Bldg. 17 pump houses, install. deep well turbine pump and motors, install. transformers, supplying material for power line constrn., constrn. 61,000 ft. steel pipe line	M. Peterson, Sec.
Canada	Bassano, Alta.	Nov. 18, 8 p.m.	Constrn. pump shaft, intake pipe, power house, stand pipe, deep well pump, boilers, &c.	G. B. R. Bond, Sec.
Wisconsin	La Crosse	Nov. 18	Constrn. 6,600 ft. c-i. pipe, two Ventura meters	Bd. Pub. Wks.
Ohio	Cleve. Heights	Nov. 19, noon	Constrn. 6-in. main	H. H. Canfield, Clerk.
Wisconsin	La Crosse	Nov. 22	Furn. 8,000,000 gal. pumping engine, also 5 centrifugal pumps	Bd. Pub. Wks.
British Col.	Kerrisdale	Dec. 2, 5 p.m.	Furn. 33 miles 4 to 12-in. steel pipe at Point Grey	E. A. Cunliffe, City Clk.
Louisiana	New Orleans	Dec. 12, noon	Installing mechanical draft apparatus	F. S. Shields, Secy.
California	Tehachapi	Dec. 30	Constrn. water works, cost \$16,000	F. A. Lathrop, Engr. Los Angeles.

LIGHTING AND POWER

Ohio	Mount Cory	Nov. 12, noon	Constrn. poles, wires, &c.	E. J. H. Reminger, Vil. Clerk.
Ohio	Cleveland	Nov. 14, noon	Install. light signal on water works crib.	W. J. Springborn, Dir. Pub. Ser.
Canada	Kamloops	Nov. 14, noon	Constrn. intake and flume system	J. J. Carment, City Clerk.
Pennsylvania	Philadelphia	Nov. 14, noon	Furn. electric lighting for year 1913	G. D. Porter, Dir. Pub. Ser.
Illinois	Fairfield	Nov. 15	Constrn. addition to lighting plant	Mayor Harlan.
Michigan	Sioux Ste. Marie	Nov. 19, noon	Constrn. arc lighting system	M. M. Patrick, Lt. Col. Engrs., Detroit.
Illinois	Chicago	Nov. 20, noon	Furn. station apparatus for operating tungsten lamps	South Park Comrs.
Nevada	Fallon	Nov. 21	Furn. gates, valves and operating mach.	U. S. Reclamation Service.
Wisconsin	La Crosse	Nov. 22	Furn. two turbo generators & condensors, 5,100 ft. transmission line, boilers, switch boards, traveling crane, etc.	Bd. Pub. Wks.
Canada	Toronto	Dec. 10	Furn. and installing 1 or more 18,000,000 gal pumping engine	H. C. Hocken, Mayor.

FIRE EQUIPMENT

Canada	Yorkton, Sask.	Nov. 12, noon	Furn. comb. chem. and hose automobile	T. F. Acheson, Sec.
Manitoba	Winnipeg	Nov. 13	Furn. 2 motor hose wagons, 2 horse-drawn hose wagons, 5,000 ft. 2½-in., 600 ft. 3½-in. hose & 30 fire alarm boxes	Chrmn. Bd. of Control.
Michigan	Monroe	Nov. 18	Furn. motor-driven chem. hose wagon	Jacob Kull, Chief Fire Dept.
Pennsylvania	Johnstown	Nov. 21, 8 p.m.	Furn. combination chem. and hose wagon	Fire Com.
Iowa	Defiance	Jan. 1	Furn. hose cart and fire hose	Town Council.

BRIDGES

California	Napa	Nov. 12, 10 a.m.	Constrn. stone bridge, cost \$14,000	N. W. Collins, Co. Clerk.
Maryland	Easton	Nov. 12	Constrn. concrete bridge	J. B. Harrington, Clerk Comrs.
Nebraska	Thedford	Nov. 12 (re-ad.)	Constrn. reinforced concrete bridge	County Comrs.
Ohio	Akron	Nov. 13, 11 a.m.	Constrn. Case Ave. bridge	C. L. Bower, Clk. Co. Comrs.
Indiana	Laporte	Nov. 14	Constrn. approach to bridge	F. A. Hausheer, Co. Aud.
Ohio	Akron	Nov. 25, 10.30 a.m.	Constrn. superstructure	C. L. Bower, Co. Clerk.
Indiana	Terre Haute	Dec. 1	Constrn. two concrete bridges	R. E. Gibbons, Co. Survey.

MISCELLANEOUS

Missouri	Kansas City	Nov. 12	Collecting, removing, delivering and disposing of garbage for 10 years	A. C. Wright, Purch. Agt.
New Jersey	Linden	Nov. 13, 8 p.m.	Furn. and install. fire escapes	Joseph Ross, Dist. Clerk.
New York	New York	Nov. 14, 2 p.m.	Furn. 1½ ton motor truck	A. J. O'Keefe, Comr.
Washington	Spokane	Nov. 15	Moving and installing in new building jail fixtures	City Council.
Canada	Scudder	Nov. 16, 6 p.m.	Constrn. 26 miles tel. line on Pelee Island.	J. E. Quick, Reeve.
Ohio	Youngstown	Nov. 16, noon	Constrn. retaining walls and steps	W. H. McMillin, Clk.
New Jersey	Long Branch	Nov. 20, 10 a.m.	Repairing jetties and refilling walk	J. W. Flock, Dir. Parks.
Kentucky	McKee	Nov. 25, 4 p.m.	Constrn. jail	J. W. Mullins, Chrmn. Com.

STREETS AND ROADS.

Fort Smith, Ark.—City engineer is preparing estimates of cost of paving South Sixth st., from Garrison ave. to National Cemetery.

Montgomery, Ala.—Construction of two roads at cost of \$8,000 to State has been authorized by W. S. Keller, State Highway Engineer. Jefferson County road is to be constructed from Jugtown, extending northward, and will be made of chert. The Chilton County road is to run out of Maplesville. Each road is to cost \$8,000.

Alameda, Cal.—Bonds amounting to \$158,000 are said to have been sold for paving.

Pasadena, Cal.—J. H. Kreidler, manager of Bureau of Efficiency, is interested in suction street sweeping machines, especially those motor driven, and he would like to hear from manufacturers of such machines.

Pasadena, Cal.—Resolution of intention for sidewalk on Washington st., from Fair Oaks to Sunset, has been read for first time.

Pasadena, Cal.—Resolution of intention for oiling, curbing and guttering of Mentor ave., north from Washington, has been read for first time; also for oiling, grading and guttering of First st., from El Molino to Lake St.

Riverside, Cal.—Interest in long-talked-of proposal for bonding county for

good roads is revived by action of board of supervisors in passage of resolution providing for appointment of highway commission.

Sacramento, Cal.—Members of State Highway Commission will present plans and specifications for construction of ten strips of State highways, which Commission proposes to have built under \$18,000,000 bond issue. Commission will seek permission from State Advisory Board to advertise for bids for construction of following strips: San Luis Obispo County, from the city of San Luis Obispo to Santa Margarita, 6.4 miles, oiled concrete pavement, which is, in other words, oiled facing of surface on a concrete base, Stanislaus County, through the town of Ceres, .7 of a mile, oiled concrete pavement, Butte County, from Lindo Channel, 1½ miles north of Chico, to the northern boundary of the county, 14.2 miles, oiled concrete pavement, Santa Clara County, Edenvale to Morgan Hill, 13 miles, oiled concrete pavement, San Diego County, Encinitas to Oceanside, 10.3 miles, oiled concrete pavement, Merced County, from the city of Merced to the southern boundary line of the county, 14.2 miles, oiled concrete pavement, San Mateo County, Redwood City to the southern boundary of the county, 3.3 miles, asphalt surface on a macadam base; at Burlingame, .2 of a mile, asphalt surface on a concrete

base, Monterey County, 3.2 miles north of the Kings County bridge to Greenfield, 7.4 miles, oiled concrete, Mendocino County, from Ridewood to Willetts, 6.9 miles, grading only.

San Jose, Cal.—Resolution to grade and gravel westerly half of Crittenden st., from south line of Empire st. to a point 275.68 ft. southerly therefrom, has been given second reading and adopted.

Naugatuck, Conn.—Purchase of road roller is being discussed.

Fort Wayne, Ind.—Engineer Randall has been instructed to prepare plans for paving Huestis ave., from Mine st. to Fox ave.

Indianapolis, Ind.—Resolutions have been adopted for improvement of various streets.

Quincy, Ill.—City Engineer Webster P. Bushnell has been instructed to go over streets which it has been proposed to improve, and to report to committee probable cost of putting streets in first class condition. In about five miles of streets will be gone over, according to present plans.

Richmond, Ind.—Board of works has accepted proposition of M. Rumley Co. to pave Washington Ave. from North 6th St to Bridge Ave. with creosoted blocks.

Richmond, Ind.—Recommendations have been made for improvement of various streets.

Leavenworth, Kan.—Ordinance has been passed providing for issuing of Internal Improvement Bonds for various street improvements. T. H. Kelmeyer, City Clerk.

Mt. Vernon, Ky.—Bonds in sum of \$100,000 have been voted for good roads purposes in Rockcastle County.

New Albany, Ky.—Petitions for improvement of Charlestown road from the New Albany city limits to Clark County line, less than three miles, have been filed with County Auditor at New Albany. Specifications for proposed highways are contained in petitions. Roadway is to be fifteen feet wide, with broken stone, cinder and screenings to depth of seven inches.

Boston, Mass.—Construction of new State highway parallel to Revere Beach boulevard is under consideration.

Charlotte, Mich.—Appropriation of \$37,285 for building of good roads in this county has been allowed by Board of Supervisors and County Roads Commissioners will start immediately on work of surveying, which they hope to complete so that actual road building can be started first thing in spring. Of this amount \$2,000 is for purchase of some necessary machinery. It is planned to build about 17 miles of good roads at an average of \$2,000 per mile.

Grand Rapids, Mich.—Finance Committee of Board of Supervisors will recommend that Kent County Good Roads Commission be allowed full amount of appropriation asked, \$3,000, roads in county.

St. Paul, Minn.—Board of Public Works is considering preliminary or final orders for \$1,000,000 of paving next year.

St. Louis, Mo.—Board of Public Improvements has recommended to Municipal Assembly ordinances for following street improvements, at estimated cost given: Brick—Carter ave., Newstead to Marcus, \$33,002; Wilson ave., Hereford to Cooper, \$4,891; Nashville ave., Tamm to Louisville, \$12,709; Bates st., Alabama to Grand, \$20,301; Virginia ave., Cherokee to Utah, \$6,645; Newby st., Hall's Ferry to Canaan and Estella, \$17,038; Bessie ave., Newstead west 820 ft., \$10,144; Idaho ave., Kansas to Fillmore, \$11,347; Lexington ave., Taylor to Cora, \$9,861; Duncan ave., Sarah to Boyle, \$14,437; Natural Bridge ave., Taylor to Kings' Highway, \$32,241; Natural Bridge ave., King's Highway to Union, \$31,785; Gravois ave., Grand to Spring, \$15,397; Prairie ave., Cozens to Easton, \$2,634; reconstruction of Hebert st., Eleventh to Twenty-first, \$22,577; Asphalt—Delor st., Virginia to Alaska, \$8,209; Labadie ave., Union to Albany, \$5,331; Abner pl., Ashland to Natural Bridge, \$12,387; Bitulthie—West Park ave., Billon to Childress, \$23,475; Maffitt ave., Clara to Goodfellow, \$13,631. Telford, Oil Treatment—Bowman ave., Simpson to Elizabeth, \$1,396.

Nevada, Mo.—Proposition to issue \$20,000 of bonds for purpose of building rock roads in Center Township, of which Nevada is part, has been carried by close margin of 11 votes. Road to be built is part of Kansas City-Joplin automobile road.

Paulding, Miss.—Special elections will be held in Jasper County on Nov. 5 to determine on issuance of good road bonds in sum of \$25,000 each in supervisor's districts Nos. 1, 2 and 3, and in sum of \$35,000 in supervisor district No. 4.

Kallispell, Mont.—Work of constructing North Fork road, running from Columbia Falls to Canadian line along banks of North Fork of Flathead River, will be begun as early as possible in the spring.

Butte, Mont.—Deer Lodge County will use equipment of Silver Bow County in building new road near Gregson Springs.

Elizabeth, N. J.—Plan of building a county road between Elizabeth and Roosevelt is under consideration.

Perth Amboy, N. J.—Ordinance has been passed to grade Neville st., from Cornell st. to Groom st.

Roselle Park, N. J.—Borough Engineer Higgins has been instructed to advertise at once for bids for paving of Clay ave.

Roselle Park, N. J.—Borough Engineer Higgins has stated that specifications for paving of Chestnut st. had been approved by State Road Commissioner.

Trenton, N. J.—Question of extending South Willow st. from West Front st. to new park is generally favored.

Auburn, N. Y.—Board has approved resolution of Committee on Good Roads urging construction of State road between this city and Weedsport.

Brooklyn, N. Y.—Sum of \$10,000,000 has been authorized for street improvements and sewers in Brooklyn and Queens.

Buffalo, N. Y.—Widening of Michigan st. is being discussed.

Buffalo, N. Y.—Paving of Kenilworth ave., from city line to Main st., is urged.

Buffalo, N. Y.—Common Council has decided to pave Congress st. and repave Cottage and Mortimer sts.

Howell, N. Y.—Bond issue of \$50,000, 000 will be voted on for good roads.

Nyack, N. Y.—During next two weeks three new portions of State roads in Rockland County will be advertised for bids.

Oneida, N. Y.—Construction of concrete pavement from county line bridge to Mansion House at Kenwood is being discussed.

Oswego, N. Y.—Highway Committee of Board of Supervisors has held meeting with County Superintendent of Highways E. A. Howard, in which resolution was adopted indorsing proposition of appropriating \$50,000,000 for State road work, to be voted upon at general election.

Poughkeepsie, N. Y.—Board of Public Works has determined to pave Perry st., from Main to Union sts. with vitrified brick upon proper foundation.

Rochester, N. Y.—Improvements have been planned for various streets.

Saranac Lake, N. Y.—Plan of street improvement is being considered.

Syracuse, N. Y.—Appropriation of \$50,000,000 for improved highways in this State is being considered.

White Plains, N. Y.—At meeting of Board of Trustees it was voted to put matter of improving of Post road, from Scarsdale town line to Broadway, South Broadway to fountain, and thence Westchester ave. to Harrison town line, up to voters. Letter was received from State Highway Commission in which it was stated that village's share would be \$63,100, and that State would pay for \$23,000.

Akron, O.—City Council has passed ordinances providing for paving of portions of Rhodes ave., Cross, Crozier and Yale sts.

Columbus, O.—City Council has passed ordinances providing for paving of portions of Tallmade st. and Indianola ave.

Dayton, O.—Resolution has been adopted declaring it necessary to improve Far Hills ave., Oakwood, from Park ave. to point 320 ft. south of south corporation line by constructing storm water sewer. Geo. L. Keller, Clerk.

Dayton, O.—Resolution has been adopted declaring it necessary to improve alley north of Lexington ave., from Deal ave. to Yunker ave.

Findlay, O.—Road improvement bonds in sum of \$35,000 have been sold.

Hamilton, O.—City Council is said to have passed ordinances providing for paving of portions of Gray ave. and Sycamore st.

Steubenville, O.—Paving bonds to amount of \$50,000 have been sold.

Youngstown, O.—City Council has passed resolution for paving of Ina ave.

Coquille, Ore.—A highway is planned from Coquille, through Bandon, to Curry County line. Route of proposed highway to Roseburg will follow what is now known as Myrtle Point-Roseburg stage road. It will start at Empire on Coos Bay, pass through North Bend, Marshfield, Coquille, Myrtle Point and over present Middle Fork route. Support is also pledged to road from Empire down the coast to Bandon.

Erie, Pa.—Ordinance has been passed authorizing issuance of \$2,000 in bonds for constructing culvert in State st., south of 26th st.

Erie, Pa.—Resolution is being considered for authorizing \$6,000 in bonds for repaving of W. Fourth st.

Philadelphia, Pa.—Mayor has authorized opening of Twenty-sixth st., from Tasker to Moore, and Twenty-seventh st., from Morris to Moore.

Denison, Tex.—City Council has authorized Alderman Davis, chairman of streets and alleys, to purchase combination street sweeper and sprinkler to be used on brick paved thoroughfares, and sufficient oil to treat all macadamized streets and avenues within city limits.

Orange, Tex.—Orange County Commissioners' Court is considering propositions made by leading citizens of county regarding further use of \$200,000 road bond issue in the building of roads.

San Antonio, Tex.—Citizens of Medina County have voted in favor of issuing \$40,000 road bonds.

Temple, Tex.—Members of County Commissioners' Court of Bell County have purchased necessary road machinery and equipment for purpose of com-

mencing work on 8 miles of graveled public road between this city and Belton, which is to start on Nov. 1.

Ogden, Utah.—Following roads are to be established: Fish Lake forest will have two new roads, one from Salina to Fish Lake, and other through the Monroe canyon; in Uinta forest new road will be built from Colton to Theodore; new road will be established through Logan canyon in Cache forest; in Powell forest, road from Sweetwater to Escalante will be improved.

Newport News, Va.—Board of Supervisors of Elizabeth City County will take first active step towards paving county road between Hampton and Phoebus by adoption of resolution asking P. St. Julian Wilson State Highway Commissioner, to have proper surveys made of road.

Norfolk, Va.—Street improvements, with aggregate cost of \$17,500, have been recommended by Public Improvement Committee of City Council. Streets named in committee's report, and improvements provided for on each, together with cost, are as follows: East Brambleton ave., curb and pave on the north side to first car rail, \$3,240; Tyler st., curb and gutter, \$1,580; Mantoo st., between Pembroke and Fairfax, \$1,700; North Clay ave., between Brambleton and Highland, curb and gutter, \$1,500; Pollard st., curb, gutter and grade, \$275; Cooke ave., pave, \$3,180; Ave. B, shell, \$270; Scott st., between Monticello and Granby, curb, gutter and grade, \$830; Thetford st., between Graydon and Redgate, water main and pave, \$4,270; Llewellyn ave., water main from Twenty-second to Twenty-third, \$720.

Edgewood, W. Va.—Bond issue has been voted for improvement of streets.

Port Angeles, Wash.—Clallam County will shortly vote on \$300,000 bonds for construction of road to connect with state highway No. 14.

Seattle, Wash.—Plans have been approved for following improvements: Twelfth ave. South, paving, at estimated cost of \$24,000; Wheeler st., grading, etc., at estimated cost of \$1,600; Ravenna blvd. et al, paving at estimated cost of \$50,000; Eleventh ave. West et al, paving, at estimated cost of \$35,000.

Seattle, Wash.—Resolution has been adopted by City Council authorizing improvements of various streets.

Seattle, Wash.—Paving of W. Wheeler st. with brick and asphalt is under consideration; estimated cost, \$130,000.

Spokane, Wash.—City Council will be asked to narrow Division st., between Seventeenth and Eighteenth aves. to same width as street at other points.

Spokane, Wash.—Petitions are now being circulated to form new State highway district and extend macadamized road from Hilliard some 21 miles to Milan. Work, it is estimated, will cost between \$80,000 and \$100,000 and can be completed next summer if petitions are signed now.

Spokane, Wash.—Citizens of Orchard Heights district are urging construction of another road across Great Northern into Spokane.

Janesville, Wis.—Bonds to amount of \$700.85 issued by city to defray expense of improving North Main st. have been sold to Miss Cornelia V. Reddy.

Milwaukee, Wis.—Board of Supervisors has authorized improvements of large number of highways.

CONTRACTS AWARDED.

Birmingham Ala.—By Board of Revenue, contract to build 3 miles of State aid road, to Young & Wallace, local contracting firm. Road to be built will cost \$8,000, of which amount State pays half. Road to be constructed commences at Jugtown and extends toward Warrior.

Bakersfield, Cal.—Thompson Bros., of Fresno, contract for paving C and Maple sts., for \$17,342 and \$6,327 respectively.

Oakland, Cal.—To Ransome-Crummey Co., contract for improvement of Livingston st., as approach to Livingston st. wharf, at amount of \$3,421.05.

Pasadena, Cal.—To W. A. Dontanville for grading, oiling, guttering and curbing of Flower st. at \$3,375.

Sacramento, Cal.—Following are contracts awarded by Commission: In Santa Clara County, macadam base and asphalt surface, to City Street & Improvement, Co., \$41,905. In Sonoma County, from Healdsburg to Santa Rosa, oiled concrete, to Richard Keating & Sons, San Francisco, \$61,396. In Los An-

geles County, the Calabasa road, oiled concrete, to Rogers Bros. Co., Los Angeles, \$33,043. In Santa Clara County, oiled concrete, to A. Teichert & Son, Sacramento, \$30,688.

Washington, D. C.—To Davis Construction Co. contract, at \$29,188, for concrete paving, at Georgetown reservoir.

Bloomington, Ill.—By Board of Local Improvements, contract for paving Clinton st., to I. D. Lain at \$1.91 per sq. yd.

Elgin, Ill.—By Board of Local Improvements, contract to Logan & Gierz Co., at \$34,497.44, for paving Charles st.

Quincy, Ill.—By Board of Local Improvements, contract to Jos. Eiff & Son, city, for paving Donation st., at \$1.046.

Frankfort, Ind.—By Commissioners of Clinton and Tipton Counties, to Lawrence W. Seaman, Frankfort, at \$7,685, for C. C. Gordan road.

Frankfort, Ind.—For constructing a gravel road, to William E. Bolt, of Cyclone, for \$5,943.

Gary, Ind.—By Board of Works, contract for improving Omaha ave. with macadam pavement, to Neil & Davis.

Greensburg, Ind.—To Reed & Thompson, of Greensburg, contract for paving with brick and macadam portions of Broadway for \$20,162.

Knox, Ind.—By Board of Commissioners of Starke County, contract to H. L. Short, North Judson, Ind., at \$9,200, for gravel roads.

Logansport, Ind.—By Cass County Board of Commissioners, following road contracts: Schleigelmilch road, \$13,850, and Burkshire road No. 1, \$1,895, Martin McHale, 348 Ottawa st.; Burkshire road No. 2, \$1,606, D. A. Hyman, 525 W. Market st.

Richmond, Ind.—By Commissioner, for Oliver Scanlon road, to Earl Morrison, at \$10,193.

South Bend, Ind.—By Board of Public Works, to Hoban & Roach, at \$4,073.42, for paving Wayne st., between Main st. and Vistula av.

Bayview, Iowa.—For paving auto road from Athol to Bayview to Elmer Dole, of Post Falls.

Pittsburgh, Kan.—For macadamizing East Fourth, 8 ins. thick and 20 ft. wide, to Thogmartin & Gardiner, of Fort Scott, at \$1.65 per lin. ft. and excavation at 35 cts. per cu. yd. Also for macadamizing East Seventh st, 8 ins. thick and 18 ft. wide, to Thogmartin & Gardiner at \$1.44 per lin. ft. L. E. Curfman, City Engr.

Wichita, Kan.—By City Commission, contract for paving with brick and asphaltum, Douglas ave., at \$1.79 per sq. yd.

Louisville, Ky.—By Board of Public Works, contracts for reconstruction of following asphalt streets: Chestnut st., American Standard Asphalt Co., Floyd and Lee sts., \$18,563; Walnut st., Louisville Asphalt Paving Co., 221 S. Fifth st., \$20,568; Washington st., Bickel Construction Co., 443 Garden st., \$3,387.60.

Belair, Md.—To Thomas C. Forsythe, contract for constructing Belcamp and Wesley roads for about \$26,000.

Malden, Mass.—By Street and Water Commission, for repaving of Ferry st., as follows, price being per sq. yd.: John D. Devir, 50 cts.; Frank H. Cowin, 58 cts.; F. S. & A. D. Gore, 67 cts.; C. J. Duggan, 74 cts.; C. W. Dolloff & Co., 65 cts.

Lincoln, Neb.—To Abel & Roberts, contract, at \$1,329, for macadam roads on Charleston and Tenth sts.

Long Branch, N. J.—Contract between Standard Bitulithic Co. and city for resurfacing of asphalt streets has been ratified at meeting of Board of Commissioners.

Ocean City, N. J.—By Cape May County Freeholders contracts for road work as follows: Constructing the Ocean City blvd., to Robert E. Hand, for \$87,986, and Cape May Point blvd., to Keeler & Miller, for \$10,790.

Albany, N. Y.—By Board of Contract and Supply, contracts as follows: Improving Warren st., from Lake ave. to Quail st., T. Henry Dumary, \$11,349.05; improving Elk st., from Hawk to Swan st., M. F. Dollard, \$7,333.50; improving South st., from Champlain st. to Broadway, M. F. Dollard, \$6,447.80.

Buffalo, N. Y.—By Common Council, contract for repaving Bryant st. with asphalt, to Henry Burgard Co., of Buffalo, at \$7,600.

Buffalo, N. Y.—By Park Board, contract for paving southern side of Bidwell Parkway with bituminous macadam to German Rock Asphalt Paving Co., for \$18,890.

Yonkers, N. Y.—To Canepi & Nolan for regulating and grading Desmond ave. at \$7,646.90.

Yonkers, N. Y.—To Canepi and Nolan, for Nepperhan ave. sewer at \$2,500.

Yonkers, N. Y.—To Harlem Contracting Company, for paving Riverdale ave. with asphalt block at \$24,659, and to Kearns and Hart, for paving Nepperhan ave. at \$28,987.66.

Canton, O.—By State Highway Commissioner, to Peter Christensen, Canton, at \$22,930.31, for grading and 7,116 ft. brick paving on Canton-Waynesburg road.

Dayton, O.—For improving Bolander ave., to A. J. Kammer at \$770.

Dayton, O.—By State Highway Comr. to Graham & Kinnear, Columbus, at \$13,990, for Springfield pike, in Montgomery County.

Fremont, O.—By Board of Public Service, for paving Buckland av. to Ziegler & Reardon.

Pomeroy, O.—By State Highway Commissioner, contract to George E. Bowers, Middleport, O., at \$9,760.50, for grading and paving with brick 1 mile of road in Chester Township.

Johnstown, Pa.—Contracts for State roads in Cumberland, Potter, Jefferson, Clearfield, and Indiana Counties, but none for Cambria County, have been awarded at Harrisburg by State Highway Commissioner F. M. Bigelow. The Baker-Owen Construction Co., of this city, received contract for building 3,119 ft. of road in Osceola, Clearfield County. The contracts let were for following pieces of State road: Cumberland County, Upper Allen Township, 11,100 ft., Thomas Meehan & Sons, Philadelphia.

Johnstown, Pa.—Potter County, Pike Township, 900 ft., and Galeton Borough, 6,283 ft., E. Whalen, Towanda, Jefferson County, Punxsutawney 4,271 ft., Bennet & Scheerer, Indiana, Clearfield County, Osceola Borough, 3,119 ft., Baker-Owen Construction Company, Johnstown, Indiana County, Indiana Borough, 2,854 ft., and White Township 8,894 ft., M. Bennet & Sons, Indiana.

McKees Rocks, Pa.—To Frank Bryan, contract at \$800 for repaving Third st., from Broadway to Woodward av.

Meadville, Pa.—For paving Cottage st., from Chestnut st. to Cherry alley, to George M. Harris, at \$501.50; also for paving Cherry alley, from Cottage st. to Park ave., at \$571.40.

Galveston, Tex.—By City Board of Commissioners, contract to P. J. Vantrue, at \$3,754.73, for approximately 2,333 sq. yds. concrete pavement and 784 lin. ft. concrete curbing.

Orange, Tex.—To Ray McDonald, contract for building 58 miles of road in Orange County.

Morristown, Tenn.—To Murray Construction Co., Knoxville, Tenn., contract, at \$24,965.70, for laying 7 blocks of paving in business district.

Seattle, Wash.—For grading of Thirtieth ave. South, to Henry Brice & Co., at \$4,935.

Seattle, Wash.—For construction of concrete walks on Eighth ave. West. Six bids were received, lowest being that of A. J. Baumgartner at \$17,209.55.

Spokane, Wash.—Nine street improvement contracts, totaling about \$25,000, on which bids have been received by City Council have been awarded to contractors as follows: To Mitchell Bros., crosswalking and sidewalk Eighth ave., D to F st., and D st. substitute to Eighth ave., \$1,611; grading and curbing the same, \$1,162. To C. M. Payne, sidewalk and crosswalking F st., Sixth ave. to Rosemond ave., \$3,452; grading the same, \$3,452. To Mitchell Bros., grading and curbing Queen ave., Crestline to Legerwood st., \$7,557; sidewalk and crosswalking the same, \$8,045. To C. M. Payne, grading, curbing and sidewalking Gardner ave., Lindeke to A st., \$1,940. To C. M. Payne, sidewalking Fairview ave., Belt st. to Northwest blvd., \$1,840. To C. M. Payne, sidewalking and crosswalking Euclid ave., Freya to Haven st., \$1,690.40.

SEWERAGE

Northside, Cal.—Building of one large east and west storm drain for northwest section is being discussed.

Oakland, Cal.—Resolution has been adopted for construction of sewers in various streets.

San Jose, Cal.—City Engineer has been instructed to prepare plans for sewer in Lenzen ave., from Vendome ave. to Guadalupe.

Orlando Fla.—Citizens have voted to construct sewer system. E. G. Duckworth is chairman Bond Trustees.

Eustis, Fla.—Election will probably be held shortly to vote on issuing \$29,000 bonds for sanitary sewer system.

New Bedford, Mass.—Committee on Roads, Bridges and Sewers has recommended that sewer be laid in Adams st., from Mt. Pleasant st. westerly, a distance of 550 ft., and that appropriation of \$1,150 be made for same. Also sewer in Ashland st., between Austin and Linden sts., a distance of 405 ft., at expense of \$800.

Swampscott, Mass.—Swampscott has appropriated sum of \$3,900 for completion of sewers in Beach ave., Mapledale pl. and Greenwood ave.

St. Paul, Minn.—Park Board has rejected three bids for construction of sewer at Como Park as being too high. Lowest was \$4,500. City Engineer's estimate for work was \$2,250. Members of board will confer with City Engineer and may decide to have city construct sewer.

Memphis, Mo.—Plans are being prepared for new sewerage system.

Elizabeth, N. J.—Ordinances have been passed for construction of sewers in various streets.

Irvington, N. J.—Ordinance has been passed to provide for laying of sanitary sewers in Park pl., Nesbitt terrace and Prospect ave.

Brooklyn, N. Y.—Petitions have been signed for construction of sewer in Cornelia st., from Woodward to Forest ave., and in Forest ave., from Cornelia st. to the railroad crossing of the B. R. T. in Woodbine st., from Forest to Fairview ave., and in Forest ave., from Putnam ave. to Palmetto st.

Lockport, N. Y.—Ordinance for construction of drain and water pipe in East Ave., from present drain to Lover's lane, has been adopted. City Clerk has been authorized to advertise for proposals.

Lockport, N. Y.—Only one bid was received for construction of Chapel st. drain, from C. B. Whitmore Co., at \$6,337.50, but contract could not be awarded, as appropriation was only \$4,000.

Oswego, N. Y.—Election is to be held for purpose of determining whether bonds of city shall be issued in amount of \$200,000 for construction of sewers, drains, sewage disposal plants and other necessary construction in accordance with plans prepared by City Engineer Charles H. Snyder and Consulting Engineer Olin H. Landreth of Union College, Schenectady, which have been approved by the Common Council.

Seneca Falls, N. Y.—For sum of \$1,319.19 S. Soper & Son will build Mynderse st. sewer, recently authorized by Village Trustees.

Erie, Pa.—Ordinance has been passed providing for construction of 9-in. sewer in Twentieth st., from Wayne to Perry sts.

Sharon, Pa.—City Council is said to have accepted plans for sewerage disposal plant. Engineer is E. E. Miller, of Pittsburgh.

Ogden, Utah.—At meeting of City Board of Commissioners, City Engineer was instructed to advertise for bids for constructing sewer on Twenty-ninth st., from Grant ave. to Adams ave., on Van Buren ave. between Capital and Twenty-fifth st., on Lafayette ave., between Twenty-sixth and Twenty-seventh sts.

Seattle, Wash.—Lowest bid received for construction of sewers on N. Seventh st. was Elmer Johnson's, at \$4,812.70.

Evansville, Wis.—Appropriations have been made for sanitary sewer to be laid on Fourth st. and west end of Liberty st., one also to be laid from Third to Fourth st. on Second, from Liberty to Highland, and also one on Franklin st. It was also deemed advisable to install storm sewer in sewer district D.

Sheboygan, Wis.—Sewerage and waterworks system is under consideration by committee of citizens.

CONTRACTS AWARDED.

Idaho Falls, Idaho.—For constructing 4,900 ft., 24-in. and 2,000 ft. 18-in. sewer, to Parrott Bros., of Baker, Ore., for \$19,732.

North Chicago, Ill.—By Board of Local Improvements, contract to John T. Clifford, \$5,225.44, for 5,994 lin. ft. of 8 and 9-in. vitrified tile pipe sewer, with 29 manholes.

Quincy, Ill.—By Board of Local Improvements, contracts for sewers, as follows: Jefferson st. and Twelfth and Washington sts., sewers, Henry Bees, city, at \$79,955.59 and \$5,218.39 respectively; Adams st., sewer, E. R. Harding & Co., Racine, Wis., \$1,349.10; Madison st., Jos. Eiff & Son, city, \$1,488.

Muncie, Ind.—To Lyons & Delaney, contract for construction of local sewer in Seventh st. from Liberty st. to Ft. W. C. & L. Railroad.

Harper, Kans.—To Bash & Gray, Joplin, Mo., contract, at \$25,000, for vitrified pipe sewers for Harper.

Duluth, Minn.—Bids have been opened by Board of Public Works and low bidders were as follows: Sanitary sewer in Second st., between Twenty-sixth and Twenty-ninth aves., E. Norquist & Co., \$2,632; sanitary sewer in Eleventh alley, between Twelfth and Thirteenth aves. east, E. Norquist & Co., \$371.66; sanitary sewer in Twenty-first ave. west, from Sixth st. to Fifth st., Johnson & Erickson, \$393.45; gutter on the upper side of Eighth st., from Second ave. east to a connection with the storm sewer at Third ave. east, Johnson & Erickson, \$501.75; sanitary sewer in Sixtieth ave. west, between Raleigh and Polk sts., Sunnarborg & Wilson, \$1,123.60.

Pipestone, Minn.—Contract for constructing sewers in Dists. 17 and 27, to G. S. Redmon, of Pipestone, for \$11,353.

Kansas City, Mo.—By Board of Public Works, contract to the R. E. Johnson Construction Co., 338 Olive st., at \$6,123, for sewers.

Springfield, Mo.—By City Council to J. C. Likes, 629 S. Campbell st., at \$9,431.10, for septic tank. Unit includes 3 walls and bottom of concrete work and special traveling sprinkler.

Lockport, N. Y.—To Frank J. Le Valley at \$5,700, for construction of drain in West ave.

Cleveland, O.—By Director of Public Service, contracts for sewers, as follows: Primrose ave., East 113th st. and East 112th st., William Burkhardt, \$3,418.40, \$1,456.50 and \$1,399.50 respectively; East Eleventh st. and Kipling ave., Amata Construction Co., \$1,411.60 and \$1,650.50 respectively; Dugway Brook sewer, Hoag & Zullo, \$51,748; East 114th st., E. W. Ernst, \$1,711.70.

Dayton, O.—By Board of Control, contract to Chas. F. Smith, at \$19,188.75, for sanitary sewers in Dist. 4, Ohmer Park.

Dayton, O.—To Charles F. Smith, contract for constructing sanitary sewer in Dist. 4, Ohmer Park, for \$19,189.

Dayton, O.—For construction of sanitary sewer in Sewer District No. 4, Ohmer Park, to Charles F. Smith, at \$19,188.75.

Marion, O.—For sewers, as follows: Fies av., George Landon, city, \$2,085.53; alley sewer, J. D. Gillespie, Larue, O., \$1,869.88.

Meadville, Pa.—For construction of sewer in South Cottage st., to George M. Harris, at \$498.

Knoxville, Tenn.—To O'Connor Construction Co., contract, at \$70,218.83, for Third Creek sewer.

Knoxville, Tenn.—To O'Connor Construction Co., of Knoxville, contract for constructing Third Creek sewer for \$70,219.

Clarksville, Tex.—To Dalton & Campbell, of Dallas, contract covering construction of Clarksville sewerage system, and work will begin within next few weeks. The system will cost \$25,000. Bonds to that amount have recently been voted.

WATER SUPPLY

St. Petersburg, Fla.—Plans which have been proposed for draining reservoir lake are now to be settled upon by submitting them to voters of city of St. Petersburg. Council has decided to fill lake by pumping sand into it from Tampa Bay with large dredges.

Virdein, Ill.—Committee of six, composed of three members of City Council and three citizens, has been appointed to look into matter of establishing city water works here. Committee will investigate conditions and availability of sufficient supply, and will report to City Council.

Indianapolis, Ind.—Indianapolis Water Co. has been ordered by the Board of Public Works to lay water mains in Dearborn st., from Roosevelt to Massachusetts ave. and in Massachusetts ave., from Dearborn st. to a point 850 ft. northeast.

Iowa City, Ia.—Iowa City Water Co. is contemplating installing several blocks of 10-in. mains and new pump.

Burlingame, Kan.—Citizens are said to have voted to issue \$56,000 bonds for water works.

Mesick, Mich.—Plans will be prepared for new waterworks system.

Memphis, Mo.—Plans are being prepared for new waterworks system.

Chisholm, Minn.—Water Commission will make improvements to plant to cost

\$50,000. Engineers will be asked to submit estimates for drawing plans.

South Sioux City, Neb.—Town has voted to issue \$25,000 bonds for water works system, standpipes, etc.

Gloucester City, N. J.—City has voted \$10,000 bond issue for additional machinery and for extending mains.

Rochester, N. Y.—Construction of water mains on various streets has been authorized.

Steubenville, O.—Ordinance has been passed providing for \$200,000 bond issue for installation of filtration plant.

Longview, Tex.—Citizens have voted to issue \$100,000 bonds for enlarging water works.

Portsmouth, Va.—Municipal water plant will be installed.

Centraria, Wash.—City Commissioners are considering issue of \$300,000 bonds for extensions to water system.

Ferndale, Wash.—Citizens are said to have voted \$22,000 bond issue for water works.

Tacoma, Wash.—Some method of maintaining the purity of Tacoma's water supply when Green River water is turned into city pipes is being discussed.

Sheboygan Falls, Wis.—Waterworks and sewer system is under consideration by committee of citizens.

CONTRACTS AWARDED.

Los Angeles, Cal.—Contracts have been ordered let by Water Board for almost \$500,000 worth of steel for first conduit of aqueduct distributing system, that running from end of aqueduct in San Fernando Valley across that valley to Santa Monica Mountains and into reservoirs on what is known as Franklin Canyon site. Lowest bidders for two sections of contract were Lacey Manufacturing Co., of this city, \$281,700, pipe to be delivered beside the ditch, and Riter-Conley Co., Pittsburgh, \$141,065, f. o. b. Pittsburgh. There are about 4,000 tons of pipe in each contract.

Turlock, Cal.—For constructing reservoir, to W. P. Ramsey, of Turlock, as follows: 474.7 cu. yds. reinforced concrete, \$17.80, and 272.3 cu. vds. plain concrete, \$14.

Enderlin, N. Dak.—To L. W. Schruth, Fargo, N. Dak., contract, at \$17,000, for extension of water main in Water Main Dist. No. 1.

North Chicago, Ill.—By Board of Local Improvements, contracts to C. T. Bartlett & Co., Evanston, Ill., and T. H. Iglehart, 558 Rookery bldg., Chicago, for 1,254 lin. ft. of 4 and 6-in. cast iron water supply pipe, with two hydrants and three gate-valves in portions of Second and Fourth aves.

Dunlap, Ia.—To Guy E. Smith, Indianola, Ia., contract, at \$5,114, for pipe line for extension to waterworks.

Smithland, Ia.—To Katz Construction Co., Omaha, Neb., contract, at \$6,980, for waterworks system.

Wolcott, Ia.—To Rock Island Bridge & Iron Works, of Rock Island, Ill., contract for 50,000-gal. steel hemispherical bottom water tank erected on 30-ft. steel tower.

Pratt, Kan.—To Salina Plumbing Co. of Salina, Kan., contract for installing plants for power, heat, water supply sewer, etc., on grounds of State Fish and Game Hatchery, at Platt, for \$6,719, and Harner Bros., of Osawatimie, Kan., for engine room addition to boiler house at \$1,377.

Greenwood, Miss.—To A. M. Lockett & Co., of New Orleans, La., contract for condensing pumping plant for city water works, for about \$7,500.

Plymouth, Neb.—For construction of 50,000-gal. tank from plans of Grant & Fulton, of Lincoln, to Des Moines Bridge

Haverhill, Mass.—City has closed 10-Haverhill Electric Co. at following pri

& Iron Co., of Des Moines, Ia., for \$3,950.

Portsmouth, N. H.—To Isaac Coffin Co., of Boston, Mass., contract for installing new set of boilers at city pumping station at Sherburne Springs, for \$4,488.

Lima, O.—By State Hospital Commission to Seymour & Rennick, Findlay, O., at \$5,900, for soft water reservoir at Lima State Hospital.

Pittsburgh, Pa.—To D. B. Hugh, contract for 30-in. water main in Second ave., for \$6,961.

Pittsburgh, Pa.—To D. B. Hough, contract for laying 30-in. water main in Second ave. at a price of \$6,961. F. F. Schellenberger Company was awarded contract for condenser vault and pump foundation in Herron Hill pumping station. Contract price is \$3,427.

Centraria, Wash.—Lowest bid submitted to Chehalis City Commission for construction of gravity water system was tendered by W. H. Mitchell, of Seattle. Amount of bid was \$147,570.50, or \$37,425.50 less than bonds recently voted for construction of plant.

Niagara Falls, Ont.—By Board of Water Commissioners, to the Canada Foundry Co., of Toronto, contract for electric pump at \$5,700.

LIGHTING AND POWER

Sycamore, Ill.—City Council has decided to install ornamental street lighting system in business district.

Altoona, Ia.—George T. Gibson is said to have secured franchise for electric light plant.

Hudson, Ia.—City Council is considering installing electric light system to cost \$4,500.

Indianapolis, Ind.—Order has been given the Indianapolis Light and Heat Company to install more electric street lights.

Sheldahl, Iowa.—Town has voted to grant franchise for electric lighting to Boone Electric Co.

Clay, Ky.—City Council has granted electric light franchise to company to be known as Public Service Co., which will install and operate plant.

Louisville, Ky.—Another "Great White Way" for Louisville is being planned by Jake Greenberg, president of Galt House Company. New lighted district will be Main st., from First to Eighth sts., and will be lighted with ornamental standards similar to those on Market st. Power to light district will be generated in new \$30,000 heating and lighting plant now being installed in Galt House.

New Albany, Ky.—New Albany Board of Public Works has approved contract for franchise of Federal Sign Company for proposed "White Way" in New Albany extending from Bank to State sts., on Main, Market and Spring sts., and from Main to Elm on State and Pearl sts.

Fall River, Mass.—Latest proposition offered by Fall River Electric Light Company for renewal of five-year municipal lighting contract will be considered shortly. New offer affords rate of \$30.30 per light per annum, against rate of \$91.25 under old contract.

New Bedford, Mass.—Aldermen have authorized Mayor and Committee on Street Lights to enter into agreement with New Bedford Gas and Edison Light Company for lighting service for five years and to make contract to be in effect November 1st, 1912.

Biloxi, Miss.—At meeting of Water Works Committee of Council figures were presented on comparative cost of steam and electricity for pumping station to be installed when piping is laid year contract for electric lighting with ces:

For the term of	Titanium Arc Lamps.		Magnetite Lamps	
	40 cp. Inc.	60 cp. Inc.	40 cp. Inc.	60 cp. Inc.
1 full year and less than 2 years.....	\$95.04	\$20.59	\$20.59	\$23.76
2 full years and less than 3 years.....	94.08	20.38	20.38	23.52
3 full years and less than 4 years.....	93.12	20.17	20.17	23.28
4 full years and less than 5 years.....	92.16	19.96	19.96	23.04
5 full years and less than 6 years.....	91.20	19.76	19.76	22.89
6 full years and less than 7 years.....	90.24	19.55	19.55	22.66
7 full years and less than 8 years.....	89.28	19.34	19.34	22.32
8 full years and less than 9 years.....	88.32	19.13	19.13	22.08
9 full years and less than 10 years.....	87.36	18.92	18.92	21.84
10 full years	86.40	18.72	18.72	21.60
For the term of	Magnetite Lamps		Magnetite Lamps all	
	Midnight.	Night.	Midnight.	Night.
5 full years and less than 6 years.....	\$95.00	\$130.00	\$130.00	\$30.00
6 full years and less than 7 years.....	94.00	128.50	128.50	29.50
7 full years and less than 8 years.....	93.00	127.00	127.00	29.00
8 full years and less than 9 years.....	92.00	125.00	125.00	28.50
9 full years and less than 10 years.....	91.00	124.00	124.00	28.00
10 full years	90.00	122.50	122.50	27.50

for improved water works system, for which \$70,000 in bonds was issued recently. A 100,000 gallon reservoir will be built. Committee will shortly formulate recommendation to Council.

Jensen, Neb.—Plans are being made for construction of municipal electric light plant, to cost \$7,000.

Concord, N. H.—Installation of ornamental lighting system is contemplated by Board of Public Works.

Mays Landing, N. J.—Council has appointed committee to investigate plan of installing municipal electric light plant.

Millville, N. J.—Ordinance relative to municipal electric lighting has passed first reading.

Union, N. J.—Resolution has been adopted extending lighting district No. 1 to include Woodruff ave., Long ave., Prospect st., Conant st., from Hurley's corner, Salem ave. to North ave., and North ave. to point on Conant st.

Philmont, N. Y.—Question as to whether Chatham Light, Heat & Power Company or Philmont Lighting Company will furnish electricity to village of Philmont is being discussed.

Clayton, N. C.—Citizens are considering proposition to issue \$15,000 of bonds for construction of electric light plant.

Salem, O.—Contract for lighting of new system about city has been closed with Salem Electric Light and Power Company. Contract was made for period of three years at cost of one and a half cent per kilowatt.

Parker, S. D.—Council is considering granting franchise to Chas. H. Stansfield for electric light plant.

Chattanooga, Tenn.—Market st. will probably be illuminated shortly from Sixth st. to terminal station.

Paducah, Tex.—Franchise has been granted to Lon Gresham, of Dallas, Tex., to put electric light plant in Paducah, capacity not to be less than 1,000 lights. Work is to begin at once, and it is expected to have the plant in operation by Feb. 1.

Tacoma, Wash.—Ordinance has been passed to authorize Commissioner of Light and Water to purchase and install certain electric motors and transformers, and appropriating the sum of \$1,700 for same.

CONTRACTS AWARDED.

Garrett, Ind.—By Common Council, for installation of ornamental lighting system, to Kokomo Electrical Contracting Co.

Kendallville, Ind.—By City Council, contracts for installation of new equipment in municipal electric light plant as follows: Electrical machinery, to the Fort Wayne Electric Works; engines, Allis-Chalmers Co.; condensers, Alberger Condenser Co.; piping, National Valve & Packing Co.

Spotswood, N. J.—Borough Fathers and Public Service Gas Company have signed contract for erection and maintenance of forty gas lamps on streets of Spotswood. Borough pays \$28 per lamp per year and contracting company does the rest.

Salem, O.—For new air compressor, to Canton Hughs Co., at Canton, at \$2,900.

FIRE EQUIPMENT

Pasadena, Cal.—It has been decided to ask for bids for automobile for Assistant Fire Chief.

Wilmington, Del.—Purchase of automobile for fire chief is recommended.

Missouri Valley, Ia.—Improvements are planned for fire department.

Leavenworth, Kan.—Bids will shortly be advertised for new automobile fire truck.

Thibodaux, La.—Bids will be asked for purchase of new horse-drawn apparatus for Thibodaux Fire Company No. 1.

Billings, Mont.—Council will receive bids until Nov. 6 for automobile hose and chemical outfit.

Laurel, Miss.—City officials are considering erection of fire station on Central ave.

Mullica Hill, N. J.—Purchase of new equipment is being considered.

Ithaca, N. Y.—Cayuga Hose Company No. 1 will shortly purchase new fire automobile truck.

Miamisburg, O.—Purchase of motor fire truck is being considered.

Sidney, O.—Bonds have been sold in sum of \$10,000 for purchase of motor fire engine.

Farrell, Pa.—Fire Commissioners are contemplating purchase of fire auto

truck. Meade Long is chairman of Commissioners. James W. Boyd is chief.

West Chester, Pa.—Residents of West Chester will vote on proposed increased indebtedness of \$60,000 for better equipment of Fire Department, extension of water system and removal of garbage.

Norfolk, Va.—Motor tractor will shortly be purchased for Truck No. 1.

Tacoma, Wash.—Commissioner A. U. Mills has been authorized to advertise for bids for two pieces of most modern automobile fire-fighting apparatus, consisting of front-drive tractor and newly patented gasoline-driven pumping engine. Sum of \$11,000 has been voted for latter and \$4,000 for tractor.

Beloit, Wis.—Fire Committee has been authorized to negotiate for purchase of auto fire truck.

Janesville, Wis.—About 1,000 ft. of hose will be purchased at once.

CONTRACTS AWARDED.

South Bend, Ind.—Bid of American La France Fire Engine Company, of Elmira, N. Y., for new hook and ladder motor truck for fire department, has been accepted by Board of Public Safety. Machine will cost \$6,000, will be equipped with 70-horsepower engine, and will be thoroughly modern in every particular. Other bids as follows: The Webb Co., St. Louis, \$5,750 and \$5,850; James Boyd & Brother, Philadelphia, Pa., \$6,150 and \$6,300; the Seagrave Co., Columbus, Ohio, \$6,200, \$6,275 and \$5,680.

Woonsocket, R. I.—For motor combination wagon to Knox Automobile Co., of Springfield, Mass. Following were the bidders: Knox Automobile Co., Springfield, Mass.; Pope Manufacturing Co., Hartford, Conn.; James Boyd & Brother, Inc., Philadelphia, Pa.; Kelly Motor Truck Co., Springfield, Ohio; American-La France Fire Engine Co., Elmira, N. Y.; Webb Motor Fire Apparatus Co., St. Louis, Mo.; Combination Ladder Co., Providence, R. I., and the Seagrave Co., Columbus, O.

BRIDGES

Mobile, Ala.—Contract for construction of steel bridge over Dog River, near mouth, will shortly be let by Board of Revenue and Road Commissioners. It has not been determined whether steel or wood will be used.

Macon, Ga.—City Council and Board of County Commissioners are considering plans for construction of bridge at Spring st to cost \$12,000. C. C. Anderson is City Engr.

Corydon, Ind.—Appropriation of \$6,000 has been made by Co. Council of Harrison Co. for erection of new bridge at south end of Market st. in Corydon.

Ft. Wayne, Ind.—Council has recommended construction of steel bridge at Gayshire, over Pennsylvania road.

Dyersville, Ia.—Plans are now under way for construction of new steel bridge over Bear Creek on southwest road leading out of Dyersville.

Topeka, Kan.—It is announced that bridge will be constructed over Shunganunga River at Fifteenth st., replacing present structure; probable cost, \$12,000.

Kallispell, Mont.—County Commissioners have under consideration construction of steel bridge over Whitefish River.

New Brunswick, N. J.—H. N. Scott Construction Co., of Cranbury, has been awarded contract by Board of Freeholders for culvert and bridge on new Spotswood-Englishtown road for \$600 and \$1,000 respectively. Other bids were \$200 or more higher than successful company.

Charlotte, N. C.—City Council and Southern Railway are considering plans for construction of new bridge over Moorehead st. Estimated cost is \$12,000. Joseph Firth is City Engr.

Columbus, O.—City Council has passed ordinance providing for issuing \$250,000 in bonds for improvement of Fourth st. viaduct. Structure is of concrete and will be widened 20 ft. Henry Maetzel is City Engr.

Toledo, O.—Council has voted unanimously for bond issue of \$33,000 to build new bridge across Lake Shore tracks at Sumner st.

Johnstown, Pa.—Council is contemplating construction of bridge between 7th and 8th Wards.

Washington, Pa.—Erection of river bridge between West Brownsville, Washington County, and Brownsville, Fayette County, is being considered.

Austin, Tex.—Council is planning to erect three bridges.

Fort Worth, Tex.—Five bids for construction of Allen ave. viaduct have been opened by City Commission. Bids ranged all way from \$22,000 to \$33,000. They were referred to City Engineer Von Zuben for tabulation of statements and will be returned to City Commissioners shortly. Bids are: F. A. Johnson & Co., \$31,400.13; United States Engineering & Construction Co., \$22,991; B. F. & C. M. Davis, \$28,300; Kuhlman & Blue, \$33,000, and C. T. Hodge, \$29,310.22.

West Vancouver, B. C.—City is contemplating construction of bridge over Capilano River at cost of about \$50,000.

CONTRACTS AWARDED.

Calgary, Alta.—By City Commissioners, contracts for construction of three bridges over Bow and Elbow Rivers to C. A. P. Turner, of Winnipeg, Man., one at Center st., to cost \$489,000; one at Fourth st., to cost \$104,000, and one at Ninth st., to cost \$216,000.

Ventura, Cal.—To M. E. Isham, contract by County Board of Supervisors for construction of the Simi bridge at \$7,150. Munoz & Munoz, of Los Angeles, contract at \$3,873 for constructing Arroyo Tapo bridge. Following are the bids received: (a) for both bridges, Westlake Construction Co., \$10,300; H. C. Mayer, \$7,150; Putnam Co., \$7,925; Midland Co., \$8,253. The Simi bridge will be 120 ft. long, 2 concrete abutments and 2 concrete piers, requiring 260 yds. concrete, 34,400 lbs. steel and 520 yds. fill. The Arroyo Tapo bridge will require 162 yds. concrete, 9,600 lbs. steel, 1,700 yds. fill and 620 lin. ft. fence.

Colorado Springs, Colo.—By Commissioners of El Paso County, to Central Construction Co., at \$6,700, for 100-ft. girder bridge across Monument Creek near Pike View.

Lewiston, Id.—For construction of wagon bridge across Clearwater River to A. L. Hewett, Billings, Mont., at \$46,000.

Brownstown Ind.—By Jackson County Board of Commissioners, contract to Brookville Bridge Co., Brookville, O., for 75-ft. steel span bridge, with concrete floor and abutments, over Smart ditch.

Kansas City, Kans.—By Board of Commissioners of Wyandotte County, to Kansas City Bridge Co., Gloyd Bldg., Kansas City, Mo., at \$2,000, for addition to bridge at James st., Kansas City, Kans.

Louisville, Ky.—By Board of Park Commissioners, contract to National Concrete Company, Indianapolis, Ind., at \$3,150, for bridge over Beargrass creek, near Castlewood.

Gulfport, Miss.—By Board Supervisors of Harrison County, contract for building Richards steel bridge, near Lorraine, to Austin Bros., at \$1,095.

Elizabeth, N. J.—By Board of Freeholders of Union County, for Vreelands Mills road bridge, to Arthur E. Smith, Plainfield, N. J., at \$4,425.

Mt. Holly, N. J.—By Board of Freeholders, contract for constructing two bridges in Burlington, to P. A. Hennessey, of Belvidere, at \$25,700.

Buffalo, N. Y.—By City Council, contract to Eastern Concrete Steel Company, Morgan bldg., for steel viaduct on the Hamburg turnpike and Buffalo creek and for steel and concrete repairs to bridge on Main st. and Terrace, at \$70,635 and \$10,910 respectively.

Cincinnati, O.—By Co. Commrs. of Hamilton Co., contract for construction of bridges and culverts on Batavia Pike to Wm. Nickerson, at \$6,442.50.

Delphos, O.—By Commissioners of Allen County, to Joseph L. Fortener, city, at \$1,014, for cement arch bridge over Flat Fork Creek, at E. Third st.

Paulding, O.—By Commissioners of Paulding County, for bridges, as follows: Two 140x18-ft. steel span bridges, creosoted plank and clog floors also steel stringers floor for three more spans, Oregonia Bridge Co., \$14,950. Two 43x16-ft. and 32x16-ft. bridges, with concrete abutments, Brookville Bridge Co., \$547 and \$774 respectively.

Steubenville, O.—By Board of Commissioners of Jefferson County, contract for bridges as follows: Bridge No. 27, F. J. Carter, \$1,285.50; bridges Nos. 2, 15, 10 and 16, Central Concrete and Construction Company, \$1,130, \$1,925, \$1,985 and \$1,230 respectively.

Waterville, O.—For constructing bridge over Maumee River, to Modern Construction Co., of Toledo.

Bloomsburg, Pa.—By Commissioners of Columbia County, contract to York Bridge Co., at \$3,289, for bridge at Bloomsburg.

Schwenksville, Pa.—To Brown King Construction Co., of Philadelphia, contract for concrete abutments for bridge over Permiomen Creek.

Fort Worth, Tex.—Contract for building big Main st. concrete viaduct or bridge has been awarded by County Commissioners to Hannan-Hickey Bros. Construction Co., of St. Louis, at price of \$373,948.65. Contract for constructing Seventh st. bridge, near City Park, has been awarded to Tarrant Construction Co., for \$106,772.17. A full list of bids on Main st. bridge are as follows: Hannan-Hickey Bros. Construction Co., of Chicago, \$373,948.65; Martin Carroll Co., Kansas City, \$395,222; Phee Construction & Engineering Co., Chicago, \$425,769.20; John Wheeler Construction Co., Geneva, Ill., \$433,870.60; William P. Carmichael Co., St. Louis, \$444,958.36; Thomas Shehan, Richmond, Va., \$460,204.25; Green & Sons, Chicago, \$492,819.15. On W. Seventh st. bridge, Hannan-Hickey Bros. Construction Co., of Chicago, \$106,453.70; Tarrant Construction Co., Fort Worth, \$106,772.17; John Wheeler Construction Co., \$117,734.50; Mississippi Valley Construction Co., \$117,895.16; William P. Carmichael Co., \$121,496.18; Martin Carroll Co., \$124,365; Thomas Shehan, \$135,593.85; Green & Sons, \$140,144.85.

MISCELLANEOUS

Los Angeles, Cal.—City Council will have placed before it resolution asking that First st. tunnel be constructed from point between Broadway and Hill st. to Fremont ave. At same time resolution will be read to Council asking that tunnel under Second st., from Hill st. to Figueroa be constructed. These tunnels will be asked by First Street Tunnel and Improvement Association and Second Street Tunnel and Improvement Association jointly.

Los Angeles, Cal.—Both Board of Public Works and Harbor Commission has voted to reject eight bids received from construction companies for building of first section of Municipal Dock No. 1 and to readvertise contract for sale, following making of few changes in specifications. Lowest bid received, that of Healey-Tibbitts Construction Co., was for \$492,208, as against the highest, \$649,489.90.

Los Angeles, Cal.—Action by City Council on request of Board of Public Works for \$18,000 from \$250,000 incinerator fund to construct new brick furnace at incinerator is delayed pending receipt by Council of report on matter from finance committee. This committee now has question of whether new incinerator be built at once.

Los Angeles, Cal.—Bids are to be advertised for within next few days by Board of Public Works for dredging of area C of outer harbor, and filling of that portion of Huntington concession forming site of municipal dock No. 1, together with removal of 1,000 feet of stone jetty on easterly side of fill.

Pasadena, Cal.—Bids for erection of rest buildings for park have been rejected, and new bids will be readvertised for immediately.

Waterbury, Conn.—When Board of Finance holds its next meeting, Board of Public Works will ask for more than \$500,000 for work of the Street, Water, Parks and Engineering Departments.

Wilmington, Del.—City Council proposes to improve property along Christiana river at foot of Church st.

Washington, D. C.—Report from an American Consul states that resident of his district desires to be put in communication with manufacturers of traction engines of 10 to 12 horsepower (preferably gasoline) suitable for cultivating with disk harrows between rows of trees in banana plantations. Banana trees are planted fifteen feet apart in squares, and it is desired to cultivate both ways. A traction engine for this work should be comparatively light in weight in order that it may not sink into the soft ground. No. 9830, Bureau of Manufactures.

Washington, D. C.—An American Consul in an Asiatic country reports that manufacturers and dealers in sprinkling wagons equipped with suction pumps and other sanitary equipment should find it to their interest to send catalogues and price lists to a certain person named in the report. Duplicate copies should be sent to the Consul forwarding the report. No. 9825, Bureau of Manufactures.

Topeka, Kan.—Sum of \$1,500 has been appropriated for purchase of automobile for police department.

Boston, Mass.—Construction of addition to Revere Beach State bath house is being considered.

Kalamazoo, Mich.—Special committee appointed by Board of Supervisors to consider advisability of purchasing auto and rigs for sheriff's force has reported favorable on proposition, and suggested that one auto, four horses and two buggies, fully equipped, be purchased for that department.

Virginia, Minn.—Police signal system will be replaced with modern private telephone system with independent lines reaching to all parts of city.

Buffalo, N. Y.—Aldermen have authorized issue of bonds in sum of \$994,000 to pay awards to acquire lands along water front between Jersey and Georgia streets for dock and park purposes.

Dayton, O.—Resolution has been adopted to issue and sell bonds for purpose of improving McCabe Park.

Pittsburgh, Pa.—Northside is first section of city to receive official approval of Council, sitting as Finance Committee, in selection of playground sites. Three locations, situated in Twenty-first, Twenty-fourth and Twenty-seventh wards have been approved.

Toledo, O.—Council has voted to issue bonds amounting to \$750,000 for construction of new city hall.

Portland, Ore.—Following bond issues are to be voted on at special election to be held Nov. 2: Parks and blvds., \$2,000,-

000; S. Portland bridge, \$850,000; Ross Island purchase for incinerator purposes, \$300,000; garbage crematory, \$100,000; auditorium comm., \$200,000; public markets, \$200,000.

El Paso, Tex.—On recommendation of Mayor C. E. Kelly, City Engineer's office will be supplied with automobile.

Fort Worth, Tex.—Commissioners' Court has delegated Commissioner Rogers to improve sanitary arrangement and conditions at court house and jail.

Houston, Tex.—Bonds recently authorized by taxpayers of Houston for public improvements of various kinds, aggregating \$2,500,000, have been purchased by William R. Compton Bond & Mortgage Co., of St. Louis.

Portsmouth, Va.—Council has approved of \$2,218.50 appropriation for purchase of auto police patrol wagon.

Richmond, Va.—Ordinance has been passed appropriating \$1,000 to city police signal system.

Roanoke, Va.—Installation of police telephone and signal telegraph system is recommended; estimated cost of Gamewell system will be about \$10,000.

Everett, Wash.—Comrs. are considering plan of bonding city for \$80,000 for building new city hall and equipping fire dept. with automobile apparatus.

Seattle, Wash.—City Council is considering construction of municipal telephone system and municipal street railway. Ordinance was passed appropriating \$1,500 for preparing plans and specifications for telephone system to be submitted to voters for their approval at city election. Another ordinance was introduced appropriating \$300,000 for construction of north section of municipal street railway, for which \$800,000 bonds were voted two years ago.

Seattle, Wash.—Resolution has been passed authorizing Board of Public Works to advertise for bids for apparatus and equipment necessary for collection of garbage of city.

Milwaukee, Wis.—Construction of adequate comfort station for Second Ward Market is contemplated.

CONTRACTS AWARDED.

Los Angeles, Cal.—Eight bids for construction of 2450 ft. of municipal dock No. 1 have been opened by Board of Public Works. It is understood that Russell-Greene-Foell Company, successful bidder for Mormon Island channel wharf, has given lowest estimate of cost. The checks accompanying the various bids range from \$55,000 to \$75,000. They are supposed to represent one-tenth of total amount of bid. Municipal dock No. 1 is to be built on Huntington fill at cost, complete, of \$2,000,000. Work has been estimated by City Engineer's Office to cost \$750,000.

Oakland, Cal.—By Council, contract for piling and concrete foundation of new municipal auditorium, to Foster Voght Co., for \$66,897.

San Jose, Cal.—For construction of dam for lake in Guadalupe Creek, to George Raggio, at \$2,448.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
New Jersey...	Jersey City.....	Nov. 11, 2 p.m....	Imp. several streets	E. B. See, Clerk Board.
New York....	New York.....	Nov. 14, 10.30 a.m.	Constrn. flagging cross walks, paving with sheet asphalt, &c.....	C. C. Miller, Boro. Pres.
SEWERAGE				
Illinois.....	Cairo.....	Nov. 15, 7.30 p.m.	Constrn. 450 ft. 6-ft. concrete sewer.....	W. R. Cameron, City Engr.
WATER SUPPLY				
Ohio.....	Akron.....	Nov. 13, noon....	Furn. special castings for connections at reservoir	P. M. Pillmore, Dir. Pub. Ser.
New York....	Pleasantville....	Nov. 18, 7 p.m....	Constrn. 500,000 gal. reservoir and 3,000 ft. 10-in. c-l. pipe	W. H. Jahne, Vil. Clerk.
FIRE EQUIPMENT				
Kansas.....	Leavenworth.....	Nov. 12, 5 p.m....	Furn. motor comb. hose and chemical....	J. H. Kirmeyer, City Clerk.
BRIDGES				
Ohio.....	Cincinnati.....	Nov. 29, noon....	Imp. road and constrn. culverts	S. Struble, Pres.

STREETS AND ROADS

Los Angeles, Cal.—Bonds have been sold and money used for improvement of Coronado St. from Sixth to Bluff St. by grading and graveling.

Los Angeles, Cal.—Plans have been made for various street improvements.

Los Angeles, Cal.—Petitions have been received asking for improvements of various streets.

Mansfield, La.—Construction of road from Mansfield to Shreveport is being considered.

Kallispell, Mont.—Forestry department has made appropriation of \$4,000 to assist in construction of road up to Swan River County.

Buffalo, N. Y.—The grade-crossings commissioners will meet on Nov. 7 to take final action in regard to kind of structure to be used in eliminating grade crossings at Austin, Amherst and Tonawanda Sts.

Harrisburg, Pa.—Ordinance has been passed authorizing opening and grading of Green St. from Woodbine St. to Emerald St. Charles A. Miller, Clerk of Common Council.

Scranton, Pa.—Ordinance has been passed providing for extension of Luzerne St. culvert, in 5th and 21st Wards.

York, Pa.—With principal streets of city gradually being paved, next step proposed in administration's projected highway improvements will be surfacing of some of central alleys which are most traveled. Most recent petitions prepared for circulation provide for paving of Mason alley between Duke St. and Court alley, and Court alley from Mason alley to King St.

Corsicana, Tex.—Proposition to issue \$20,000 worth of street paving bonds has been approved by voters.

Lytte, Tex.—Election has been ordered by County Commissioners of Atascosa County on subject to bond issue for \$20,000 to improve roads of Lytte and Benton school districts.

San Antonio, Tex.—Plans are being considered for paving of East Commerce St.

Spokane, Wash.—City Council has rejected all bids for sidewalking and crosswalking of Euclid Ave., Freya St to Haven St., after C. M. Payne, low bidder, on work, had moved to commissioners that he had made mistake of \$1,000 in his bid and could not possibly do the work. Mistake, however, necessitated rejecting of all bids and readvertising of job for proposals.

Madison, Wis.—Full reports have been received by Wisconsin Highway Commission of money voted for state aid road and bridge construction in 1913. There are 1,195 towns in Wisconsin, of which 865 voted for state aid road construction on 1,267 different pieces of road, asking for state aid to total amount of \$757,273. Two hundred and five towns voted for construction of 337 bridges a total amount of \$107,754, which calls for \$53,877 state aid. In all, 883 different towns in 68 counties voted for state aid total amount of \$865,027, calling for sum of \$811,150 in state aid.

CONTRACTS AWARDED.

La Salle, Ill.—To Keys & McNamara, Newstadt Bldg., contract for 20,000 sq. yds. vitrified brick paving and 8,500 lin. ft. combination concrete curb and gutter in O'Connor Ave.

Quincy, Ill.—For paving Keyes' alley to Henry Rees at \$981, and for paving Donation alley at \$1,046.

New Orleans, La.—City Engineer Hardee has filed with clerk of finance committee report stating that Standard Paving Co. is lowest bidder on subsurface work in Jackson Ave., from St. Charles Ave. to Magazine St., at price of \$5,818.50, and lowest bidder on paving of same avenue for same area, with Sicilian rock asphalt, at price of \$14,860.

Clinton, Miss.—W. T. Jackson, of this place, has been awarded contract of delivering gravel which is to be used on main street.

Perth Amboy, N. J.—For grading Hanson Ave., Lee St., Hommann Ave. and Johnstone St. to Graham & McKeon and contract for grading Laurie St. was awarded to Peter Hansen and Jens L. Mathiasen by Board of Aldermen. Bids for grading were as follows: Hanson Ave.—Graham & McKeon, 35 cents a cu. yd.; Liddle & Pfeiffer, 36 cents; Peter Hansen and Jens L. Mathiasen, 37 cents; Martin Hansen, 40 cents. Lee St.—Graham & McKeon, 33 cents; Liddle & Pfeiffer, 34 cents; Peter Hansen and Jens L. Mathiasen, 37 cents; Martin Hansen, 44 cents. Hommann Ave.—Graham & McKeon, 32 cents; Liddle & Pfeiffer, 33 cents; Martin Hansen, 37 cents; Peter Hansen and Jens L. Mathiasen, 37 cents. Laurie St.—Peter Hansen and Jens L. Mathiasen, 33 cents; Liddle & Pfeiffer, 34 cents; Graham & McKeon, 34 cents. Johnstone St.—Graham & McKeon, 42 cents.

South Amboy N. J.—For laying concrete sidewalks in David St. between Broadway and Rosewell St. to Thomas & Cramer, New York City, at 20 cents per sq. ft.

Portland, Ore.—For paving roadway of approaches with wood blocks has been awarded to Giebisch & Joplin for sum of \$13,643.

Erie, Pa.—Contract for paving alley from Fourth to Fifth St., between Peach and State, re-awarded by council has been approved by mayor. The first bid was for paving alley with brick at \$1.74 the yard. Contract was re-let to W. C. Bancroft, Jr., for a cement paving at \$1.19 the square yard.

Galveston, Tex.—Bids for shelling county road in Kinkead addition have been opened, one from W. D. Haden for \$1.62 per cu. yd. for approximately 900 cu. yds. Hanson Sons bid \$1.35 per cu. yd. for same work and \$1.35 for shelling county road as advertised from the Interurban track to steam railroad track on 61st St. Contracts were awarded Hanson's Sons as lowest bidders.

San Marcos, Tex.—To Harry Hetzner contract to build sidewalks at Lake properties on Academy Hill.

Everett, Wash.—F. K. Ffolliott has been awarded contract to pave alley between Wetmore and Rockefeller Aves. from Hewitt Ave. to point within 100 ft. of the north line of Wall St. Improvement will consist of concrete surfacing and a drainage system. Three bids were received by commissioners; Ffolliott's bid was \$1,728.40, that of the Atlas Construction Co. was \$1,900, and Walsh and Christenson submitted bid of \$1,744.13.

Seattle, Wash.—By Board of Public Works for concrete walks on Eighth Ave. W. to A. J. Baumgartner at \$17,209.55, and on North Seventieth St. to Elmer Johnson at \$5,162.70.

SEWERAGE

Los Angeles, Cal.—Plans and specifications for construction of Fifth street outfall sewer in San Pedro district to supersede present outfall which empties into harbor near foot of Fifth st., causing many complaints, have been approved by Board of Public Works and bids will shortly be received. Cost of proposed sewer is estimated at \$2,500.

Opelousas, La.—Special election to authorize additional issue of \$16,000 sewerage bonds to complete sewerage system for this city has been carried.

Jersey City, N. J.—Chief Engineer Charles Van Keuren, by order of members of Street and Water Board, is preparing for hearing before Board of Finance upon the condition of sewers. He is also getting busy on plans for reconstruction of entire sewerage system in lower Jersey City.

Trenton, N. J.—City Commission will consider matter of having plans drawn up for proposed sewage disposal plant. Engineer Gregory, of firm of Gregory and Herring, will seek to have his firm continued as consulting engineers with power to draw up plans. The firm has already made estimate of what the work would cost which totals nearly \$1,000,000.

Perth Amboy, N. J.—Motion has been passed to have street commissioner advertise for bids for placing sewer in Elm st., between Market and Smith sts., to be received on November 18.

Perth Amboy, N. J.—Motion has been passed unanimously to have street commissioner advertise for bids for placing sewer in Sherman st., between Market and Paterson sts.

Perth Amboy N. J.—Ordinance to lay fifteen-inch sewer in Brodhead Place, between Sayre and New Brunswick aves., has been introduced and passed upon its first reading.

CONTRACTS AWARDED.

Quincy, Ill.—For construction of Washington st. sewer to Henry Rees, at \$5,218.39; for Madison st. sewer, to Joseph Eiff & Son, at \$1,488, and for Adams st. sewer to E. H. Harding & Co., Racine Wis., at \$1,349.10.

Baltimore, Md.—By Board of Awards, for sewers in Storm Water Contract No. 23, to Wm. McCarthy & Co., at \$5,990.27.

Detroit, Mich.—By Department of Parks and Boulevards, to William Blanck & Co. for sewer system in Ferry Field, Western Grand Blvd. and Grand av.

Grand Rapids, Mich.—By Board of Public Works, for Wealth st. extension sewer, to Joseph Rusche, at \$27,013.69.

Fostoria, O.—By Board of Public Works, contract to John J. Peters, Sandusky st., at \$1,283.70, for combined sanitary and storm water sewer, with necessary catch basins, manholes and appurtenances, in Seneca av., from Springfield to Columbus av.

Garland, Utah.—To H. G. Gilkerson, of Salt Lake City, contract for constructing sewer system for \$6,619.

Salt Lake City Utah.—For constructing pipe sewers to F. J. Everill Co., of Salt Lake City, for \$5,490.

Bremerton, Wash.—To L. Y. Statten, of Tacoma, contract for constructing concrete trunk sewer for about \$21,000.

Seattle, Wash.—By Board of Public Works, contract to Elmer Johnson, at \$5,162.70, for sewers in North 70th st., et al.

WATER SUPPLY

Los Angeles, Cal.—Steel for eleven-mile conduit from San Fernando reservoir to Franklin canyon tunnel will cost city \$422,765, according to bids received and contracts awarded. Of total of 8,259 tons required, 4,010 tons will be fabricated in Los Angeles by Lacey Manufacturing Co. and delivered at trench in San Fernando Valley at cost of \$281,700, fifty tons to be delivered in four months and remainder at rate of 250 tons a week. Remaining 4,249 tons is to be furnished by Riter-Conley Co., of Leesville, Pa., at cost of \$141,000, 1,000 tons in 120 days and remainder 120 tons a week.

Washington, D. C.—American Consulate General at Vancouver, British Columbia, reports that sealed tenders will be received until December 2 by the Clerk, Municipal Council, Kerrisdale, British Columbia, for the supply of about 33 miles of steel pipe varying in diameter from 4 to 12 inches. Particulars may be obtained at office of Water Superintendent, Municipal Hall, Kerrisdale (Vancouver), British Columbia, from whom copies of specifications, schedule of quantities, and forms of tender may be obtained on payment of \$10, which will be refunded on receipt of a bona fide tender and return of the documents. No. 9811, Bureau of Manufactures.

Washington, D. C.—American Consul at Bagdad, Turkey, has forwarded translation of circular regarding installation of waterworks for city of Nedjef. Time is too short to permit American firms tendering for the work, but there may be opportunities for American firms that have material to offer to contractor who will receive the award. Copy of the translation setting forth in detail machinery and equipment needed will be sent to interested firms by Bureau of Foreign and Domestic Commerce. No. 9812, Bureau of Manufactures.



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Charleston, Ill.—Bids will soon be asked on two low lift centrifugal pumps connected to high speed engines by Mayor T. T. Shumacher. These are for use in new filtration plant. Dabney H. Maury, Chicago, is consulting engineer.

Warsaw, Ind.—New chemical filter will be installed by Winona Electric Light & Water Co.

Sioux City, Iowa.—Plans for the proposed new reservoir have been submitted to W. W. Commissioner G. B. Healy by Consulting Engineer Dabney H. Maury, of Chicago. As soon as these are approved, bids will be asked for. After completion of new reservoir, old one will be repaired.

Big Rapids, Mich.—City may bond itself for \$50,000 for improvements on its present waterworks system.

CONTRACT AWARDED.

Bridgewater, Va.—Contract for construction of water and sewerage system for this town has been awarded to Newport News Construction Co., of Newport News, Va., at \$22,324.

LIGHTING AND POWER

Jacksonville, Fla.—Ornamental lights for Hemming Park have been ordered placed by committee on public works of board of bond trustees. The resolution, as introduced by Councilman Walker, calls for appropriation of \$900 for erection of lights mentioned.

Buffalo, N. Y.—At meeting of Chipewa Club, John A. Markett advocated better lighting of street and committee was named to work to secure such improvement on street from Genesee st. to Whitney place.

FIRE EQUIPMENT

Portsmouth, Va.—Chief Walker will request City Council to furnish fire department with auto combination wagon to be placed at Chambers engine house, and to provide automobile capable of carrying seven men to be stationed down town somewhere.

BRIDGES

Des Moines, Ia.—Polk County will vote on expending \$100,000 for permanent bridges on main roads.

Cincinnati, O.—City will pay \$65,200 for property it needs to widen entrance to Gilbert ave. viaduct at Eighth ave. and Broadway.

Fort Worth, Tex.—Two more Trinity River bridges, costing \$161,000, have been ordered built by Tarrant County. These make four such structures ordered in a week. Total cost of four will be \$600,000.

Texarkana, Tex.—Steel wagon bridge will be erected over Sulphur River, between Bowie and Cass counties.

Racine, Wis.—Repairing of west approach to State st. bridge is being planned.

CONTRACT AWARDED.

Delta, Colo.—Bids for proposed bridges at Delta and Hotchkiss have been opened by the county commissioners. While Pueblo Bridge Co. was lowest bidder on both steel and concrete bridges, no contract will be awarded until appropriation and tax levy for 1913 have been passed. Pueblo firm has expressed its willingness to proceed with construction work with understanding that the contract will be formally awarded them with passing of levy. Bid of Pueblo firm on concrete structure at Delta with 20-ft. roadway, of two spans was \$12,500, and for steel structure over Uncompahgre with 16-ft. roadway, \$9,900, and a 20-ft. roadway, \$11,000. Their bid on Hotchkiss bridge, concrete structure, with 20-ft. roadway containing three spans was \$24,000, and on steel bridge at same place, consisting of two spans and a 16-ft. roadway was \$23,640.

MISCELLANEOUS

South Amboy, N. J.—Garbage collection question is being discussed.

Salem, O.—Ohio Mutual Co., of this city were highest bidders for purchase of city bonds in aggregate of \$11,746.69 and to this firm bonds were awarded.

El Paso, Tex.—Out of 1,400 property owners, 593 voted by 3 to 1 majority to issue \$400,000 worth of municipal improvement bonds. Of total issue \$200,000 is for improvement of waterworks system; \$150,000 for sewer system, and \$50,000 for street gradings.

CONTRACTS AWARDED.

Los Angeles, Cal.—Two bids have been received by council for automobile for general use of police department and two for an ambulance. The Lord Motor Car Co. asked \$3,932 for Garford car for general use and \$4,400 for ambulance. The Premier Motor Car Co. submitted bid of \$4,500 for motor ambulance and \$3,250 for other type of machine. In accordance with specifications, Lord Co. agreed to allow \$100 for old cars to be turned in by city and Premier Co., considered old machines were worth \$1,800.

Los Angeles, Cal.—Bids for deepening channel east of municipal dock No. 1, in outer harbor, have been opened by Board of Public Works. Only bidder was the Standard American Dredging Company, which offered to do work for 20 cents a cubic yard for dredging and 15 cents a cubic yard for filling area specified in bill.

Augusta, Ga.—To T. O. Brown & Son, contract for power plant and laundry of

new city hospitals. Special Hospitals Committee. Bid for work was \$10,999. Other bids on power plant and laundry were as follows: Charles McCall Co., \$13,965; Palmer & Magruder, \$12,290; Empire Construction Co., \$12,989; H. C. Van Orme & Co., \$11,906, and McKinzie & Co., \$13,980.

New Orleans, La.—Contract for construction of new casino and boathouse in City Park was awarded to W. J. Neville, on bid of \$34,043, by Board of Commissioners of City Park.

Malden, Mass.—To National Lead Co., for supplying pig lead at 5.37½ cts. per pound.

Perth Amboy, N. J.—To Meagher & Smith, contract for erecting stone wall along easterly side of Water st. Bids were as follows: Meagher & Smith, if city furnish stone, \$4.65 cu. yd.; if contractor furnish stone, \$6.15 cu. yd. C. C. Christensen, city furnish stone, \$4.75 cu. yd.; contractor furnish stone, \$6. Liddle & Pfeiffer, city furnish stone, \$7.25; contractor furnish stone, \$8.25.

Rochester, N. Y.—To Baraly & Ingersoll, of Rochester, lowest bidders for work of repairing dam and gates at Tonawanda Creek, Orleans County, and for improvement of Oak Orchard Creek and feeder near Medina. Bid of this company was \$10,255. S. V. R. Malcolm & Son, of Medina, submitted bid of \$11,625.

Portland, Ore.—Eight building contractors submitted proposals for construction of the new city jail to Executive Board yesterday, bid of Friberg Contracting Company for \$132,320 being lowest. This bid calls for use of Denny-Renton pavers in facing building. Bid covers the construction of the basement and foundations, erection of steel and the entire completion of building. Other proposals received are: J. S. Winters & Co., \$132,897 and \$80 additional if Newberg face brick are used; Advance Construction Company, \$136,300, and \$200 additional for Newberg face brick; H. Pederson Construction Company, \$139,974, and \$255 additional for Newberg brick; Sound Engineering & Construction Company, \$153,980, and \$200 for Newberg brick; Lewis A. Hicks Company, \$142,975, and \$72 additional for Newberg brick; Litherland & Abrey Company, \$149,000; A. C. W. Berry, \$141,900 and \$100 additional for Newberg brick.

Erie, Pa.—Contract for dredging canal basin west of public docks has been let to Two Rivers Dredge & Dock Co., of Two Rivers, Wis., by State Commission.

Erie, Pa.—For construction of municipal garbage plant to J. P. Simon at \$6,508.

Pittsburgh, Pa.—By Director of Public Works Joseph G. Armstrong and Mayor W. A. Magee to W. T. Powell, at \$11,797, contract for erection of market house on Allegheny River wharf.

Dallas, Tex.—By Board of Commissioners, contract for general construction of new Parkland Hospital to G. W. Sonnefeld, at \$78,439.

Racine, Wis.—To James Corse & Co., contract for erecting garbage incinerator plant for city at price specified in their bid, \$21,000. James Corse & Co. were lowest bidders, while Louis & Kitchen, the Chicago engineering firm which had drawn plans and specifications for garbage plant and owns part of patents, were next lowest, with \$23,100.

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Some of the pitch used in this country for paving and other purposes is what is called "cut back" pitch. It is lacking in the natural oils which are so necessary to its effectiveness, and is far inferior to Barrett's Paving Pitch. "Cut back" pitch is made by mixing with very hard pitch sufficient oils or tars to "cut it back," or produce the

required consistency. In making this hard pitch originally all the life-giving oils were removed, and it has been found impossible to put back oils into pitch and make a "cut back" pitch which would last for any length of time.

Barrett's Paving Pitch is all "straight run" pitch, that is, it is distilled to the proper consistency in the first place. It retains its waterproof qualities half a century or more.

In the effort to generate the much greater heat necessary for melting the harder pitches there is danger of over-heating, or burning the pitch, and spoiling it. Barrett's Paving Pitch has a low melting point. It is less troublesome to handle. Therefore, specify not "pitch," but "Barrett's Paving Pitch" as filler for the joints of all block pavements.

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Concrete Highways.—Every person interested in the good roads movement is aware of the latest development in this important work through the use of concrete. This new type of road is now the subject of extended experiments by the United States government. It has met with such pronounced success in Wayne county, Michigan, as to give that locality national celebrity.

The Association of American Portland Cement Manufacturers has published for free distribution a comprehensive book, entitled "Concrete Highways," which will interest road supervisors, contractors and taxpayers in every section of the country. The book, which is handsomely and profusely illustrated, contains nearly a hundred pages. It was prepared by road engineers and goes into many details of construction, concluding with a tabular digest of concrete pavements in all sections of the country. The various chapters include discussion of bituminous compound wearing surfaces, grouted pavements, reinforced-concrete pavements and specifications for the one and two-course types. In fact, the book covers the entire subject in the most reliable and authentic way. Free copies of the book may be had upon application to the Association of American Portland Cement Manufacturers, Land Title Building, Philadelphia, Pa.

New Auto Tire.—W. W. Revell, St. Andrews, New York, recently exhibit-

ed a new automobile tire of his invention to the members of the Chamber of Commerce of Newburgh, N. Y. He said that the tire was absolutely punctureless, could not be blown out, the shoe could wear for an inch or more and be recovered with rubber, and the tire could be put on all wheels. The outer coating of the tire is of rubber, the main composition being of fabric and wood. The resiliency is afforded by an inner rubber tube one inch in diameter, which is filled with air under very high pressure.

Petrolithic Road.—The Louisiana Petrolithic Company, New Orleans, La., recently took a party of one hundred and fifty guests to Jeanerette, La., where a petrolithic road was under construction. Howard Egleston, the engineer in charge of construction, explained the methods of construction, and stated that the road could be built for \$6,000 per mile.

"Theoretically it's fine," stated City Engineer Weatherford, of Memphis, "but whether or not it will stand the test is for time and traffic to decide. I understand that some roads have been built in a similar manner in California and have proven a success, but that soil is different to the buckshot here. Oiling, however, is good for any roads. We have used it extensively in Memphis and found it to be excellent. Then, too, the tamping machine packs from the bottom up, instead of like a roller, from the top down."

City Engineer Hardee, New Orleans, spoke partially in favor of the road, but stated that he did not believe that it would stand heavy traffic. He said that one thing in favor of the road was its cheapness, costing about one-twentieth of the cost of a modern asphalted thoroughfare. For country roads and boulevards, he stated that he believed that it would prove most practicable.

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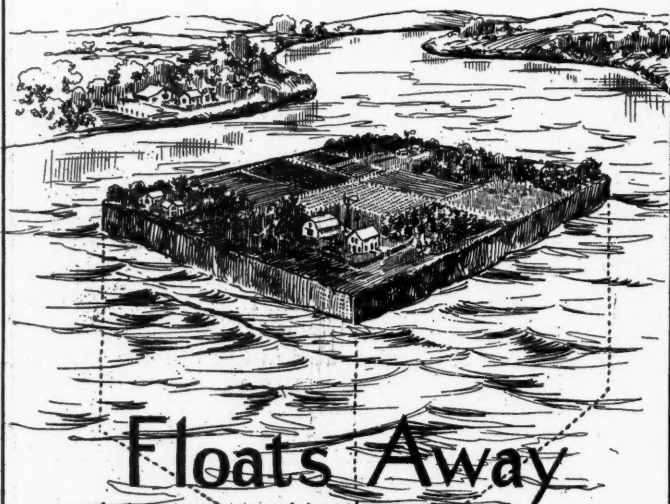


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